Disclaimer: Information contained in the report addresses environmental conditions only and is not the official South Florida Water Management District operations recommendation or decision.

M E M O R A N D U M

TO: John Mitnik, Chief, Engineering and Construction Bureau
Paul Linton, Administrator, Water Control Operations Section

FROM: SFWMD Staff Environmental Advisory Team

DATE: October 11, 2016

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Light to locally moderate showers developing mainly east through south of the Lake. The daily drumbeat of the seabreeze is over with post-frontal northeasterly winds blowing through the District. Dominant high pressure over the eastern U.S. is producing about an 8 millibar north/south pressure gradient over Florida, and that supports 15-20 mph northeast winds with higher gusts. Some fast moving garbage showers will develop within the stratocumulus clouds today and increase in coverage some tonight and tomorrow. The beginning to end of the seabreeze season was 145 days…which is right at average, and those 20+ weeks yielded 37.59 inches of rain…which is a few inches above average.

Kissimmee

On Sunday, stage in East Lake Toho was at schedule, Lake Toho was 0.2 feet below schedule, and Kissimmee-Cypress-Hatchineha was above schedule by 1.0 feet. Over the past week, discharge at S65, S65A, and S65E averaged 1,718, 2,557, and 3,841 cfs, respectively. Tuesday morning discharges were ~743 cfs, ~1,598 cfs, ~3,568 cfs, and ~4,140 cfs, respectively at S65, S65A, S65C, and S65E. Dissolved oxygen in the Kissimmee River averaged 2.83 mg/L over the past week. Kissimmee River mean floodplain depth on Sunday was 1.69 feet. No new recommendations this week.

Lake Okeechobee

Lake stage rose to 16.16 feet over the past week, moving into the Intermediate sub-band, but it has decreased to 16.01 feet over the past two days and is currently in the Low sub-band. Lake stage is still higher than last week by 0.23 feet and is 0.51 feet above the top of the preferred stage envelope (15.5 feet NGVD). During Hurricane Matthew, a seiche of almost 1.5 feet along the northwest to southeast axis occurred on the Lake.

Estuaries

Total discharge to the St. Lucie estuary averaged 6,057 over the past week with 1,187 cfs (20%) coming from Lake Okeechobee. Most inflow originated in the tidal basin as a result of rainfall during Hurricane Matthew. The seven-day average salinity at the US1 Bridge declined to near 0 and continued to be in the poor range for oysters. Total inflow to the Caloosahatchee estuary averaged 8,507 cfs over the past week with 4,386 cfs (52%) coming from the Lake. Salinity conditions are good for tape grass in the upper estuary. Salinity conditions are good for adult oysters at the Sanibel Causeway, in the fair range at Shellpoint, and in the poor range at the Cape Coral Bridge.

Stormwater Treatment Areas

Over the past week, the STAs/FEBs received approximately 100 acre-feet of Lake regulatory releases. The total amount of Lake regulatory releases sent to the STAs/FEBs in WY2017 (since May 1, 2016) is approximately 71,600 acre-feet. All STA cells are at or above target depths. Operational restrictions are in place for structure repairs in STA-1E. This week, it is recommended that no Lake releases be sent to the STAs/FEBs.

Everglades

Stage changes in the WCAs and northeastern Everglades National Park ranged from −0.09 feet to +0.29 feet. The Fish and Wildlife Commission closures within the WCAs are still in effect due to high water levels and the expectation of continued high water. The 30-day moving average salinity at the Florida Bay MFL site is 0.3 psu and the cumulative 365-day inflow from the five creeks into Florida Bay decreased to 359,777 acre-feet.

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 2.15 inches of rainfall in the past week and the Lower Basin received 1.40 inches (SFWMD Daily Rainfall Report 10/11/2016).

Upper Kissimmee Basin

Stages and departures in the Kissimmee Chain of Lakes (KCOL) are shown in Table1.

Table 1. Departures from KCOL flood regulation (F) or temporary schedules (T, A, or S) (feet NGVD). Discharge and stage data are provisional real-time data from SFWMD OASyS DualTrend; reported values are averages through midnight of the Sunday prior to the report date unless otherwise specified.

Report Date: 10/11/2016

Water Body	Structure/Site	Discharge (cfs), week's average**	Stage Monitoring Site***	Lake Stage (feet)	Schedule*	Regulation (R) or Target (S or T) Stage (feet)	Sunday Departure (feet)						
							10/9/16	10/2/16	9/25/16	9/18/16	9/11/16	9/4/16	8/28/16
Lakes Hart and Mary Jane	S62	252	LKMJ	60.5	R	60.3	0.2	0.1	0.0	0.2	0.1	-0.1	0.0
Lakes Myrtle, Preston, and Joel	S57	138	S57	61.6	R	61.3	0.3	-0.1	0.0	0.1	0.0	-0.1	0.1
Alligator Chain	S60	265	ALLI	63.1	R	63.4	-0.3	0.1	0.1	0.1	0.0	-0.1	0.0
Lake Gentry	S63	364	LKGT	60.9	R	61.1	-0.2	0.1	0.0	0.1	0.0	-0.1	0.0
East Lake Toho	S59	784	TOHOE	57.3	R	57.3	0.0	0.3	0.2	0.2	0.1	-0.1	-0.3
Lake Toho	S61	1646	TOHOW, S61	54.1	R	54.3	-0.2	0.2	0.2	0.2	0.1	0.0	0.0
Lakes Kissimmee, Cypress, and Hatchineha	S65	1718	LKISSP, KUB011, LKIS5B	52.8	R	51.8	1.0	0.6	0.6	0.9	1.4	1.2	0.5

* T = temporary schedule, R = USACE flood control schedule, S = temporary snail kite schedule, A = projected ascension line, N/A= not applicable or data not available.

** Seven-day average of weighted daily means through Sunday midnight.

*** Names of in-lake monitoring sites and structures used to determine lake stage; if more than one site is listed, an average is reported.

DATA ARE PROVISIONAL

Lower Kissimmee Basin

Discharges and stages at Lower Basin structures are shown in Table 2. SFWDAT depth maps for the Phase I restoration area are shown in Figure 12. Kissimmee River floodplain stages at selected stations are shown in Figure 13.

Table 2. Mean weekly discharge at S-65x structures, and mean weekly Phase I area river channel dissolved oxygen and floodplain mean water depth. Discharge and stage data are provisional real-time data from SFWMD OASyS DualTrend; reported values are averages through midnight of the Sunday prior to the report date unless otherwise specified.

Report Date: 10/11/2016

Metric	Location	Sunday's 1-day average	Weekly Average**									
			10/9/16	10/2/16	9/25/16	9/18/16	9/11/16	9/4/16	8/28/16	8/21/16	8/14/16	8/7/16
Discharge (cfs)	S-65	949	**1718**	1968	4001	3991	3290	1080	841	624	532	579
Discharge (cfs)	S-65A	2141	**2557**	2557	4966	4861	5101	2538	808	666	661	694
Discharge (cfs)	S-65C	3418	**3250**	4459	5247	5054	3760	2124	928	1024	1081	1000
Headwater stage (feet NGVD)		33.9	**33.6**	33.6	33.8	33.7	33.8	34.1	34.1	34.0	34.1	34.3
Discharge (cfs)	S-65D****	4156	**4185**	5532	6302	5224	3971	2172	1181	1140	1142	1037
Discharge (cfs)	S-65E	3891	**3841**	4960	5802	5246	4077	2900	910	1061	1137	986
DO concentration (mg/L)***	Phase I river channel	2.80	**2.83**	1.78	1.55	1.20	1.35	3.88	4.75	4.04	4.09	4.58
Mean depth (feet)*	Phase I floodplain	1.69	**1.55**	2.11	2.49	2.28	1.71	0.65	0.28	0.37	0.41	0.37

* 1-day spatial average from South Florida Water Depth Assessment Tool (SFWDAT).

** Seven-day average of weighted daily means through Sunday midnight.

*** DO is the average for PC62 and PC33 starting June 2.PC33 omitted for week of Aug16. DO for week of Sept 15-22 is for PC33 only.

**** S-65D discharge combines discharge at S-65D, S-65DX1, and S-65DX2

DATA ARE PROVISIONAL

Water Management Recommendations

Kissimmee Basin Adaptive Recommendations and Operational Actions

Date	Recommendation	Purpose	Outcome	Source
10/10/2016	No new recommendations.			
10/3/2016	No new recommendations.			
9/27/2016	• Begin reducing discharge when Ops and management feel the time is right (could be now) • Use the discharge table below to ramp down to 1400 cfs; however, if stage should stop declining or start to rise during the rampdown, hold the current discharge unless stage begins to decline again • If KCH stage reaches ~50.5 ft, hold ~1400 cfs while KCH stage is at or above ~50.5 ft, then: • If KCH stage declines below ~50.5 ft, continue reducing discharge, potentially to minimum discharge. However, if stage stops declining or starts to rise during the rampdown, hold or increase current discharge until stage begins to decline again or until it rises to ~50.5 ft • If KCH stage rises or stays above ~50.5 ft, hold ~1400 cfs unless stage approaches ~0.25 ft below the regulation line. If stage continues to rise into this buffer zone, use the discharge table to ramp up in anticipation of flood control releases	To the extent possible, avoid repeated wet/dry cycles in the Kissimmee River floodplain and extend the period of continuous floodplain inundation without decreasing lake stage too much. The recommendation is similar to the discharge plan used last wet season that balanced the river, the KCOL, and downstream waterbodies.	TBD	KB Operations
9/20/2016	No new recommendations.			
9/13/2016	No new recommendations.			
9/6/2016	No new recommendations.			
8/30/2016	Use figure 8a as possible for discharge rampup/rampdown at S65/S65A.			
8/23/2016	No new recommendations.			
8/16/2016	No new recommendations.			
8/9/2016	No new recommendations.			
8/2/2016	No new recommendations.			
7/26/2016	No new recommendations.			
7/19/2016	No new recommendations.			
7/12/2016	No new recommendations.			
6/30/2016	Ramp down S65/S65A discharge by 150 cfs per day to 650 cfs and hold at 650 cfs until lake stage rises to Zone A of the schedule. When stage enters Zone A, ramp up S65 discharge to 1,400 cfs as stage rises from 0.0 to 0.6 feet above the regulation line unless there is a large rainfall event. This ramp up schedule will be reevaluated when the regulation schedule reaches 52.0 feet NGVD.	The ramp down in S65/S65A discharge is intended to lessen the impact of Lake Okeechobee releases on naturally occurring algal blooms. Holding discharge at 650 cfs reflects consideration for the Snail Kites nesting in the Kissimmee River floodplain.	Implemented	SFWMD Operations Control
6/28/2016	No new recommendations.			
6/21/2016	No new recommendations.			
6/14/2016	No new recommendations.			
6/7/2016	No new recommendations.			
5/31/2016	No new recommendations.			
5/24/2016	No new recommendations.			
5/17/2016	No new recommendations.			
5/10/2016	No new recommendations.			
5/3/2016	No new recommendations.			
4/26/2016	No new recommendations.			
4/19/2016	No new recommendations.			
4/12/2016	No new recommendations.			
4/5/2016	No new recommendations.			

KCOL Hydrographs (through Sunday midnight)

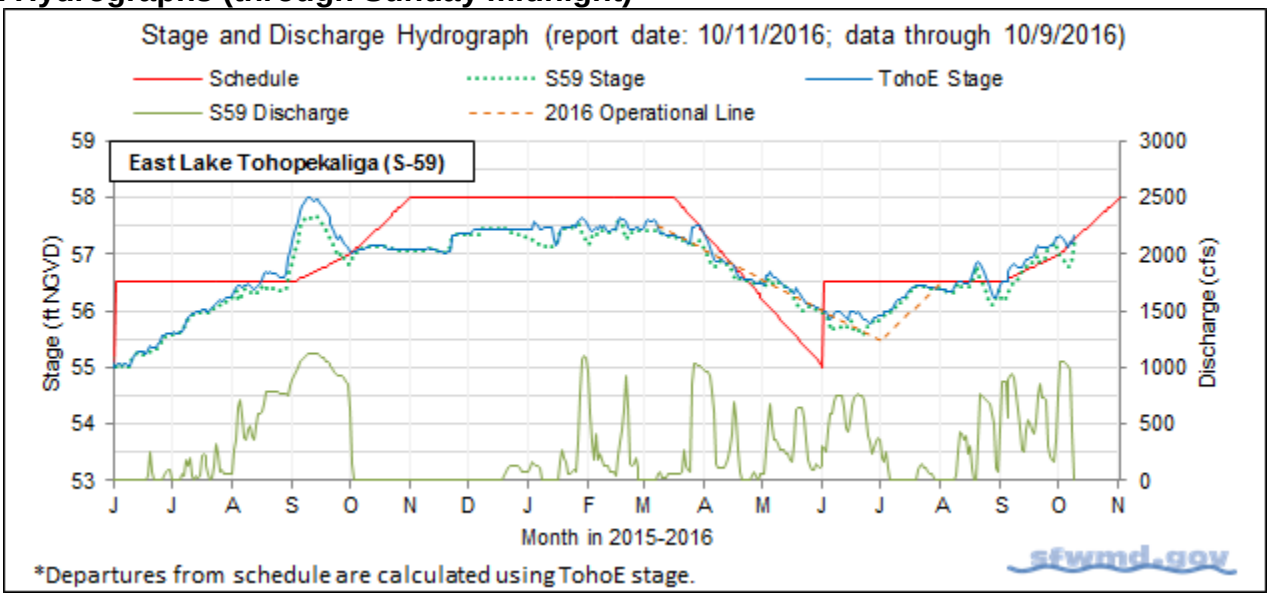


Figure 1.

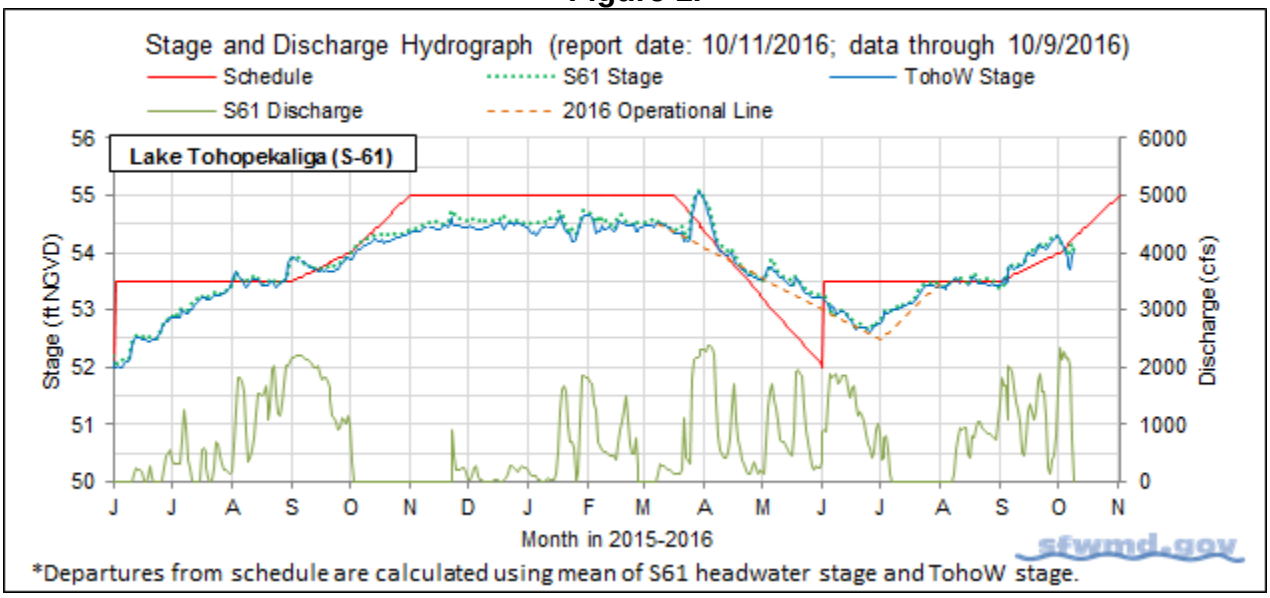


Figure 2.

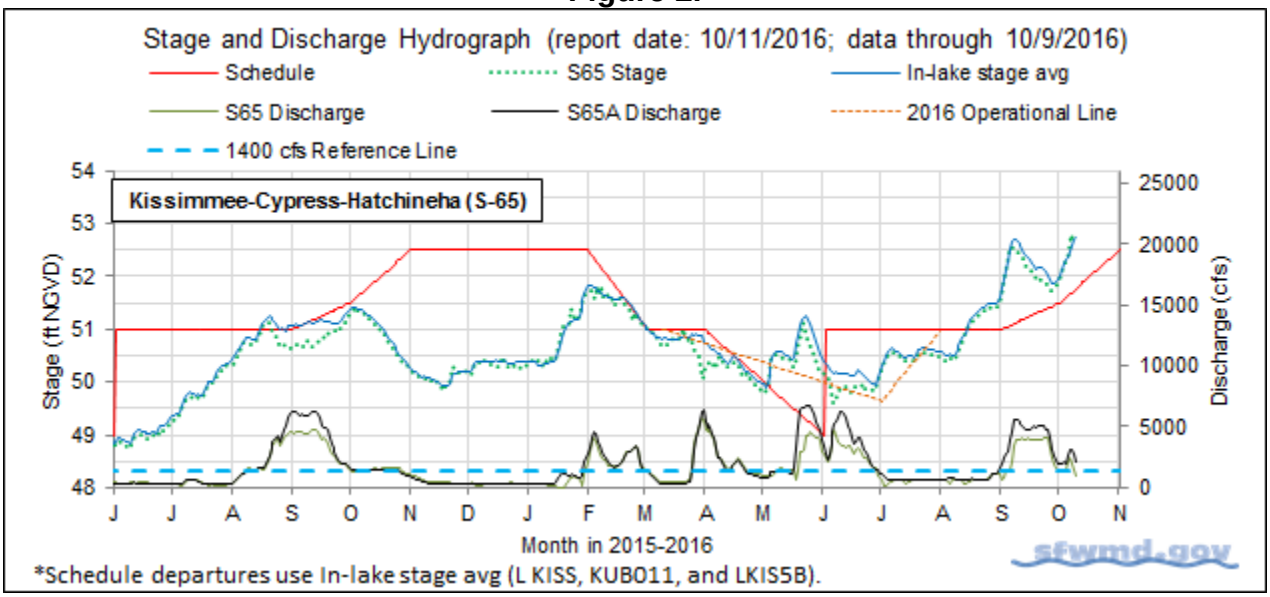


Figure 3.

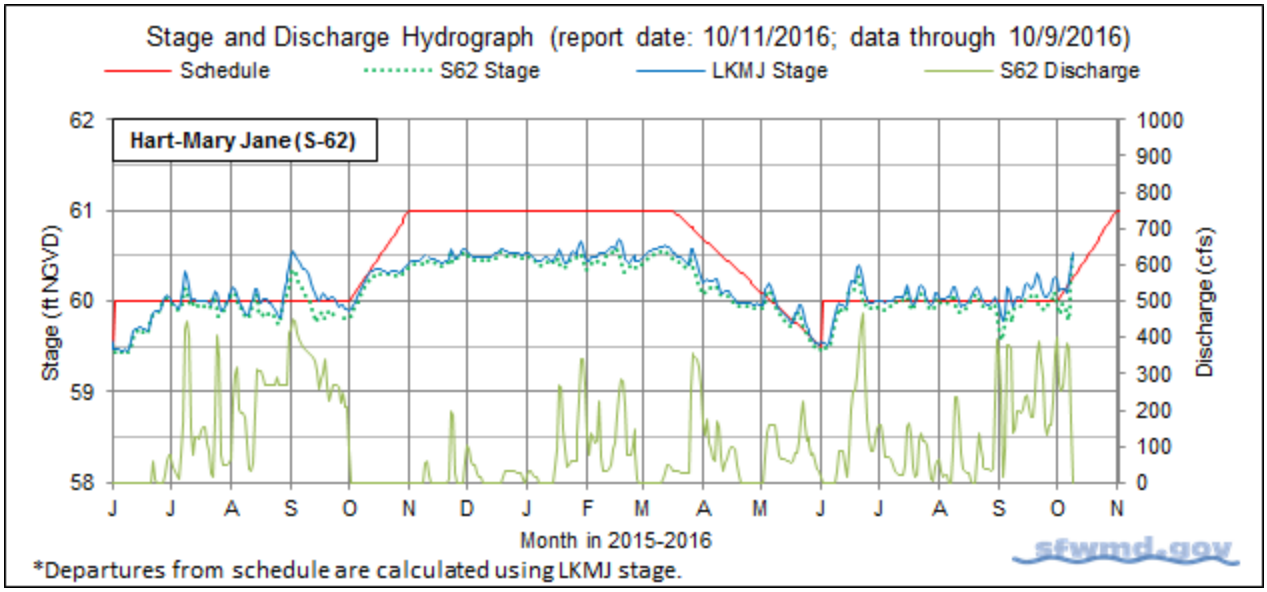


Figure 4.

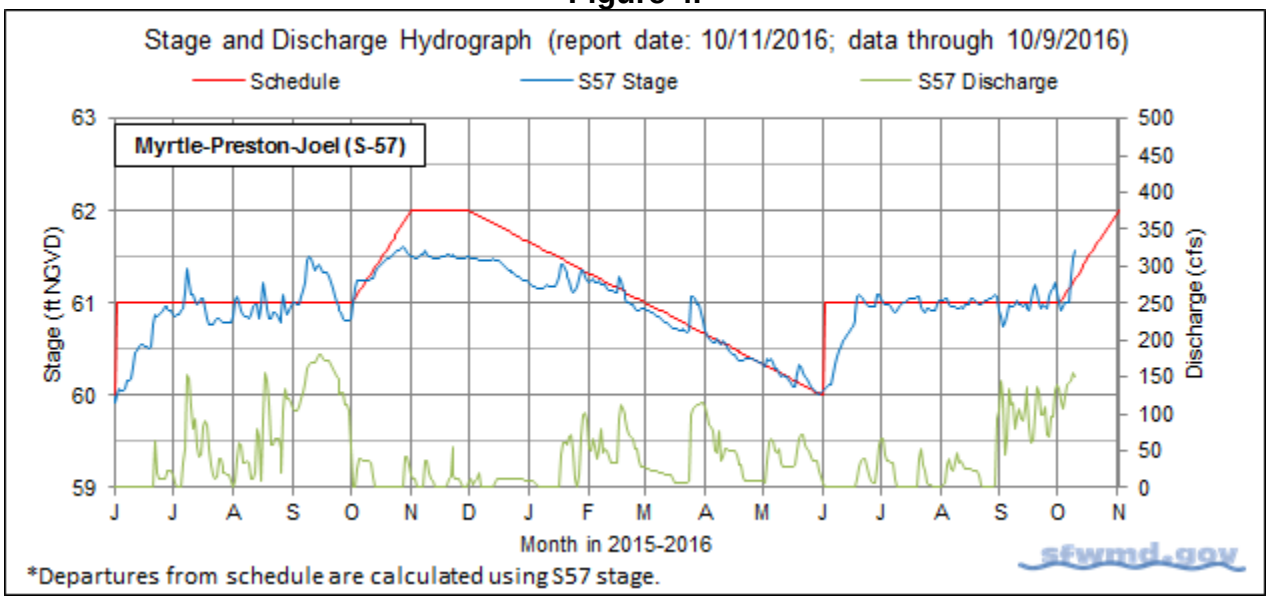
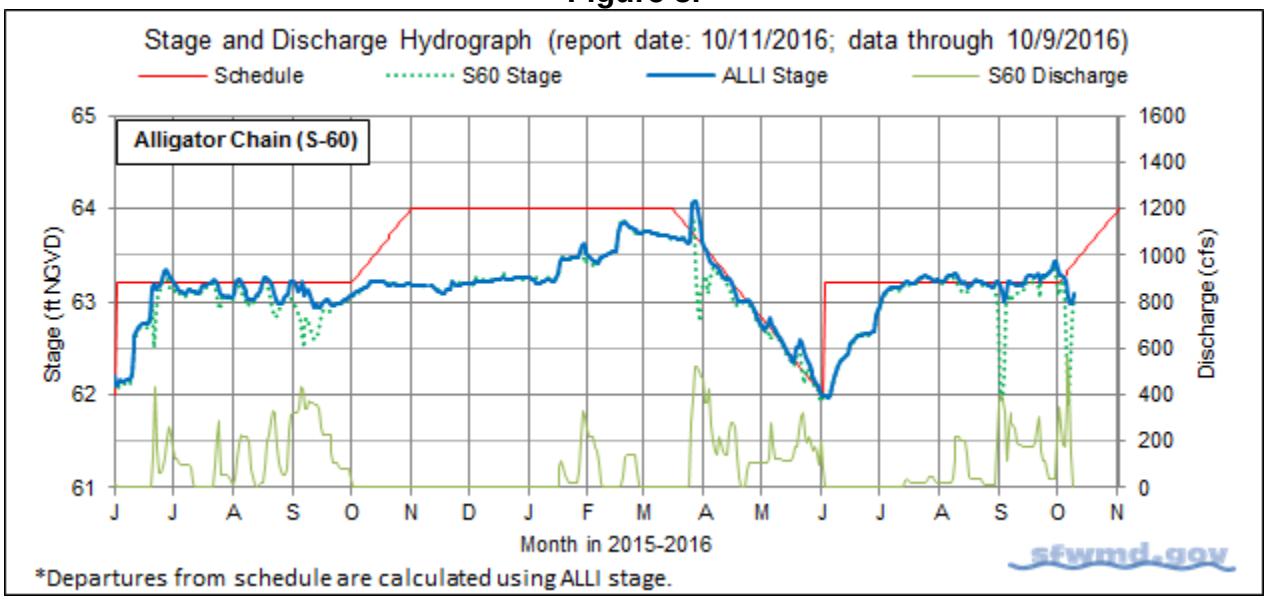


Figure 5.



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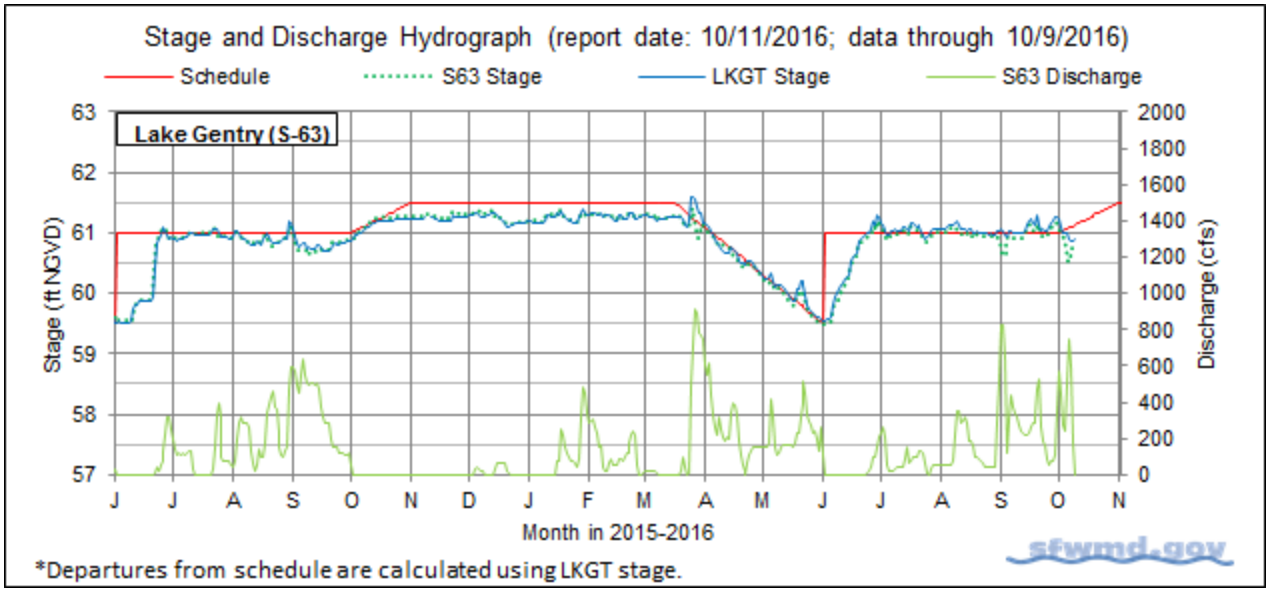

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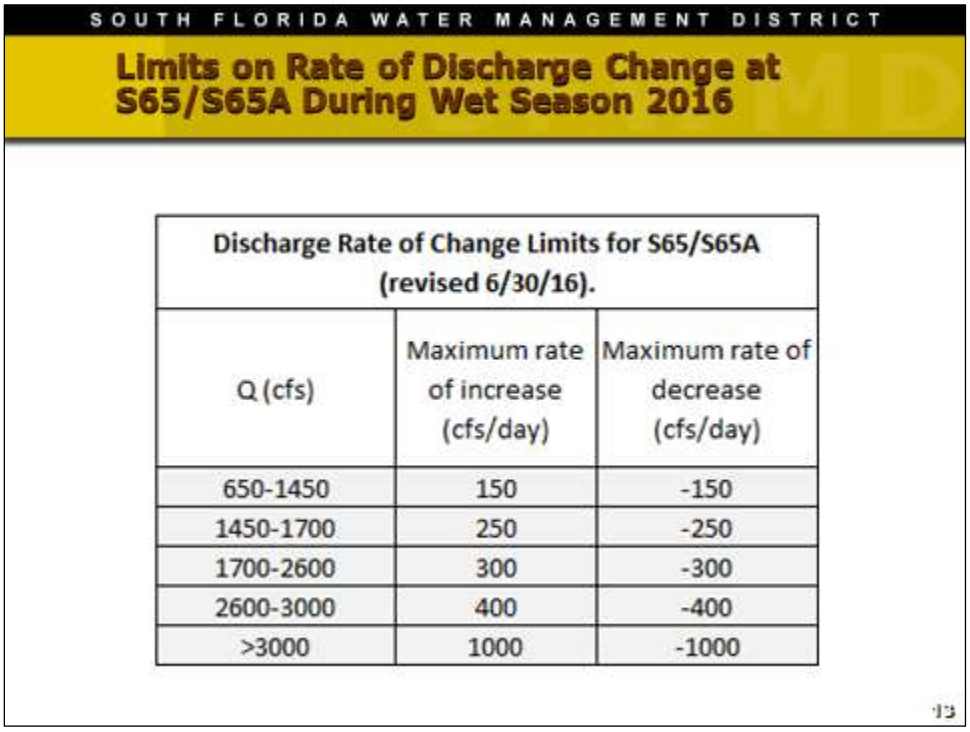


Discharge Rate of Change Limits for S65/S65A (revised 6/30/16).		
Q (cfs)	Maximum rate of increase (cfs/day)	Maximum rate of decrease (cfs/day)
650-1450	150	-150
1450-1700	250	-250
1700-2600	300	-300
2600-3000	400	-400
>3000	1000	-1000

Figure 8a. Limits on rate of discharge change at S65/S65A for the 2016 Wet Season.

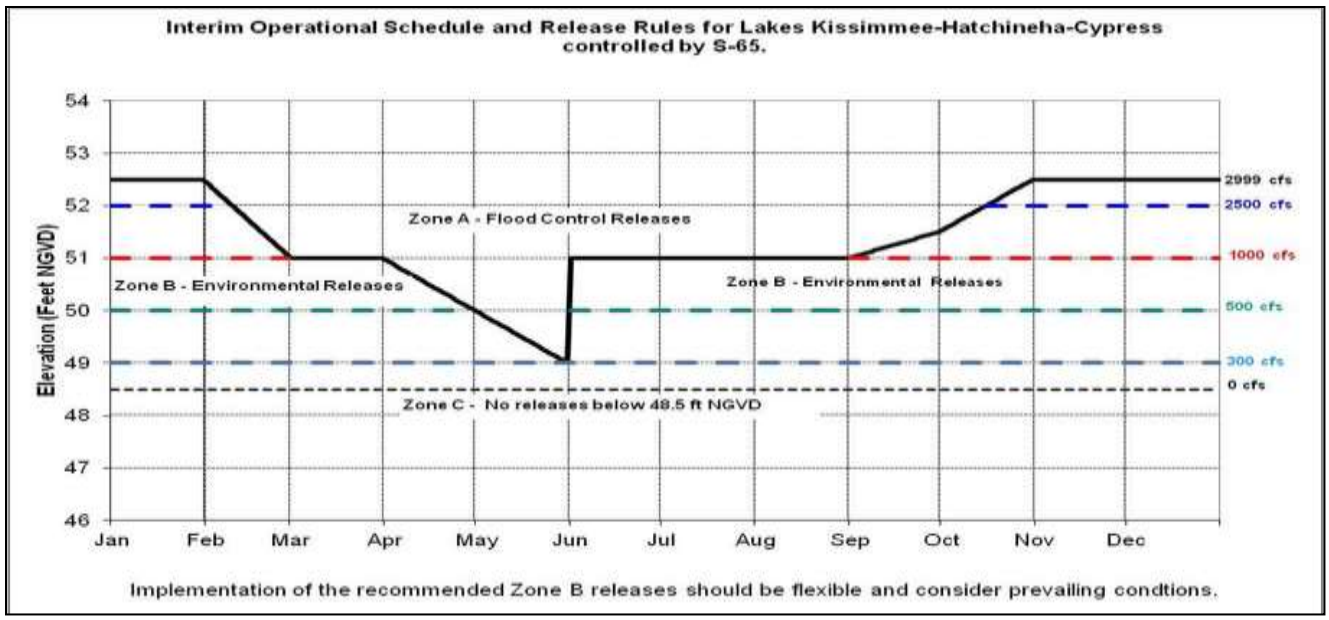


Figure 8b. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years or in Wet Season 2015.

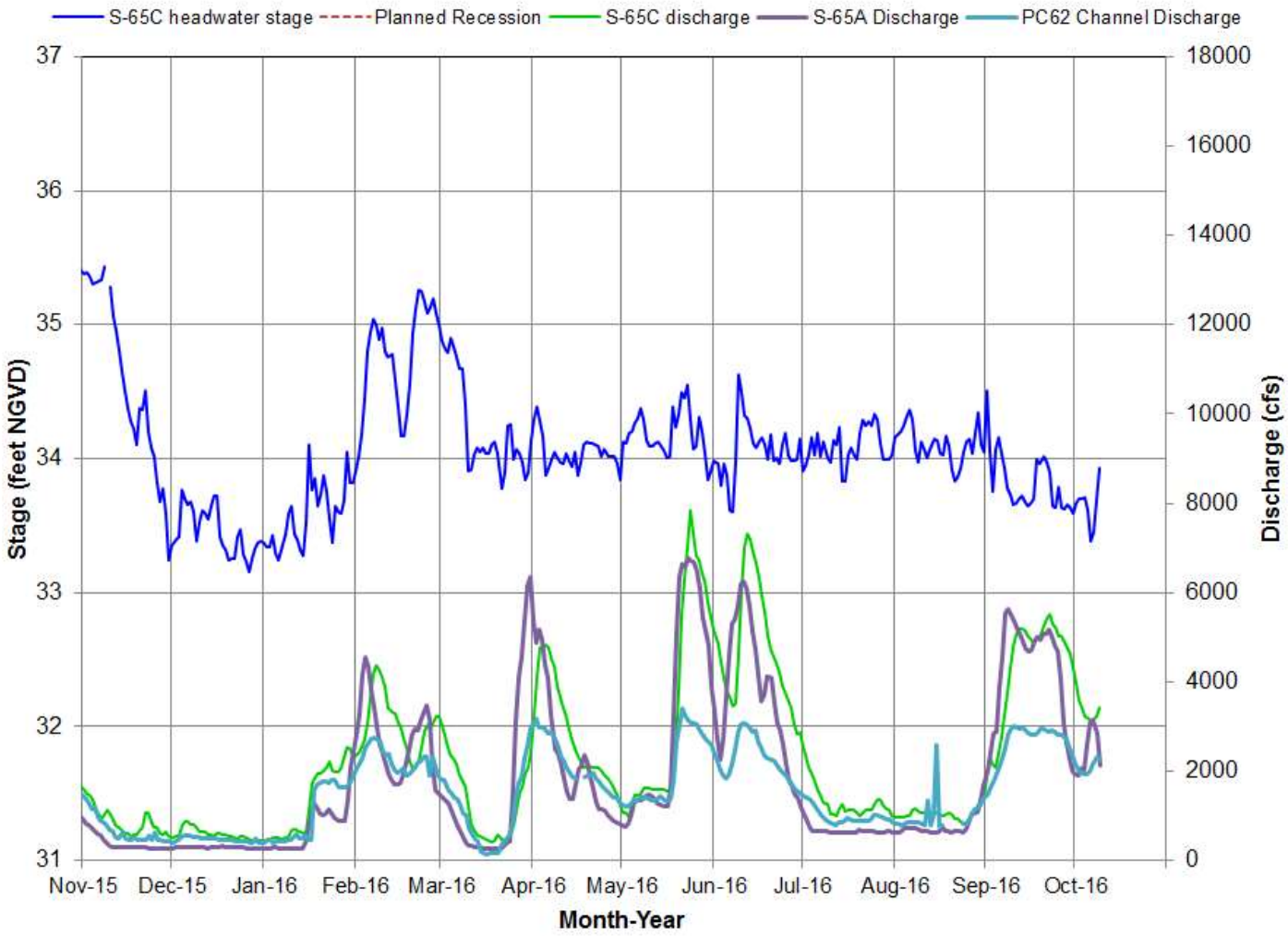


Figure 9. S-65C headwater stage in relation to discharge at S-65C, S-65A, and PC62.

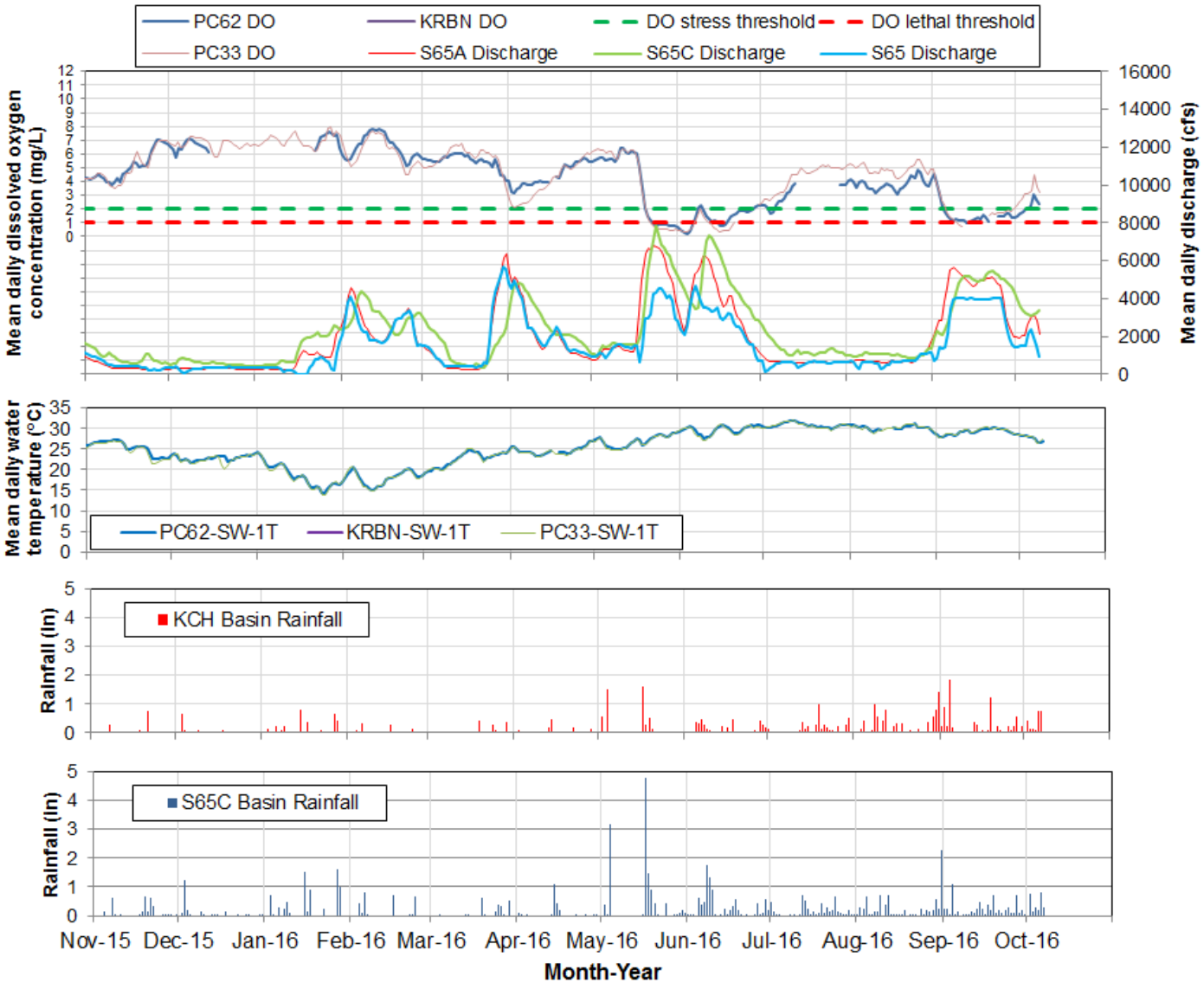


Figure 10. Mean daily Dissolved Oxygen, discharge, temperature and rainfall in the Phase I river channel.

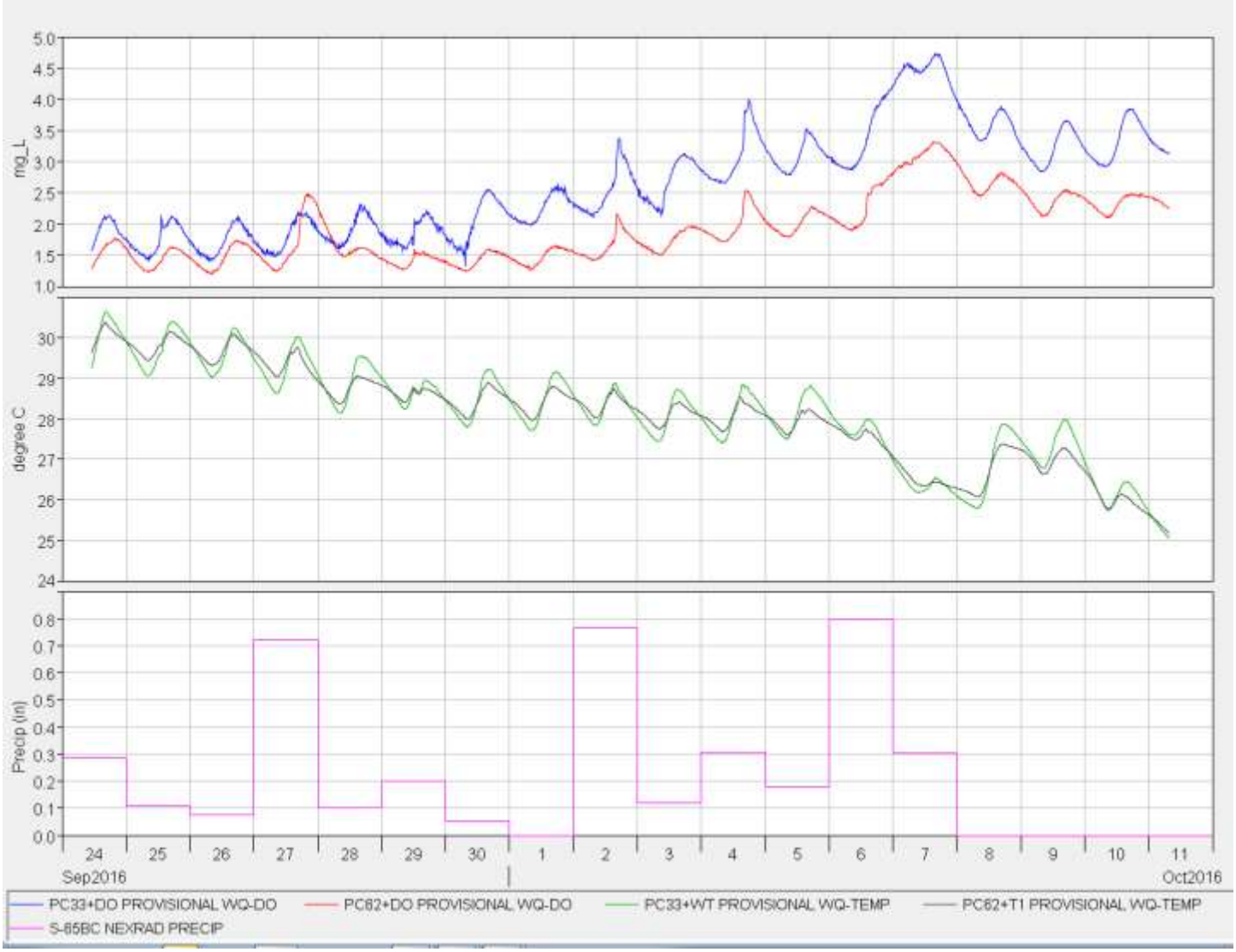


Figure 11. Phase I river channel dissolved oxygen and water temperature (measured at 15 minute intervals) and Pool BC daily rainfall.

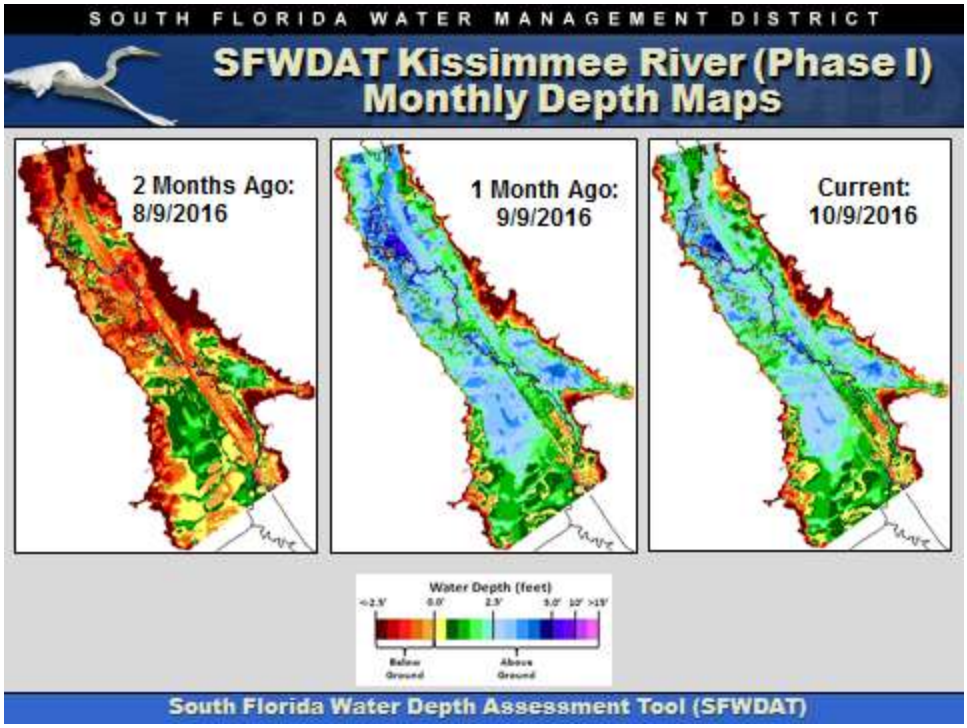
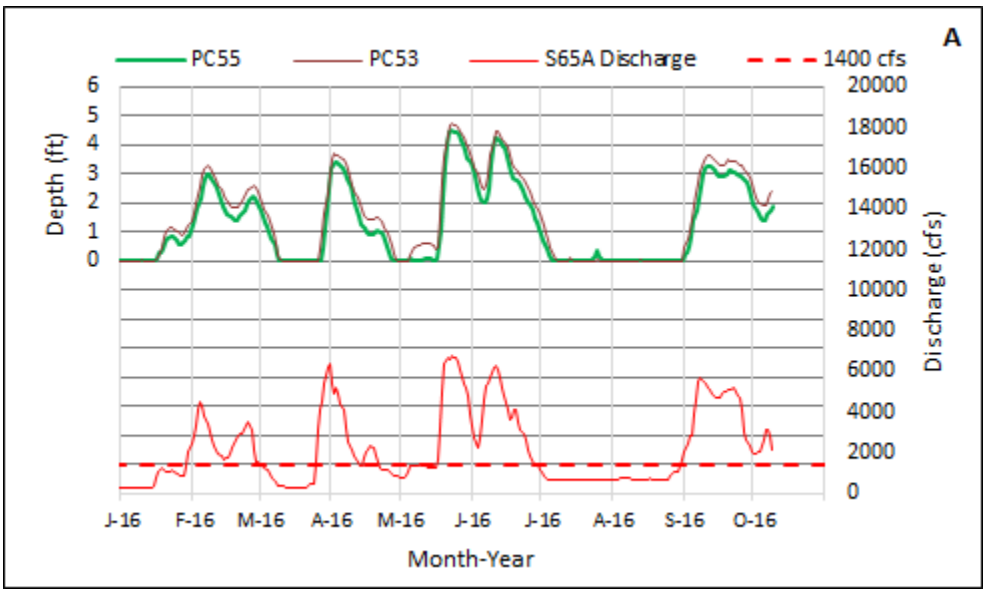
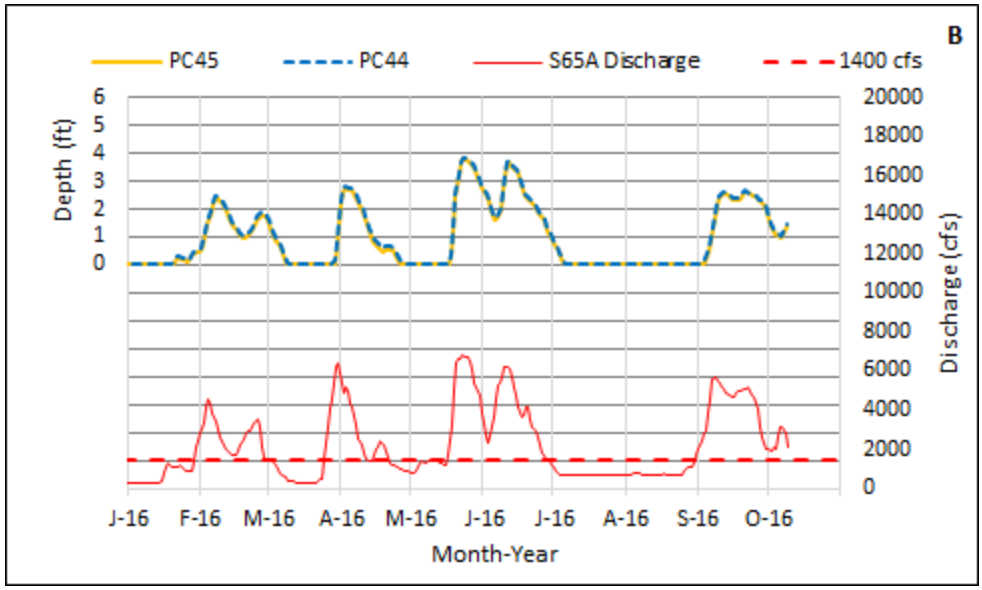


Figure 12. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to Jan. 16, 2012.





Insert. Water depth at selected northern Kissimmee River floodplain sites on (A) the PC5's transect and (B) the PC4's transect, with S65A discharge.

Kissimmee River Hydrographs

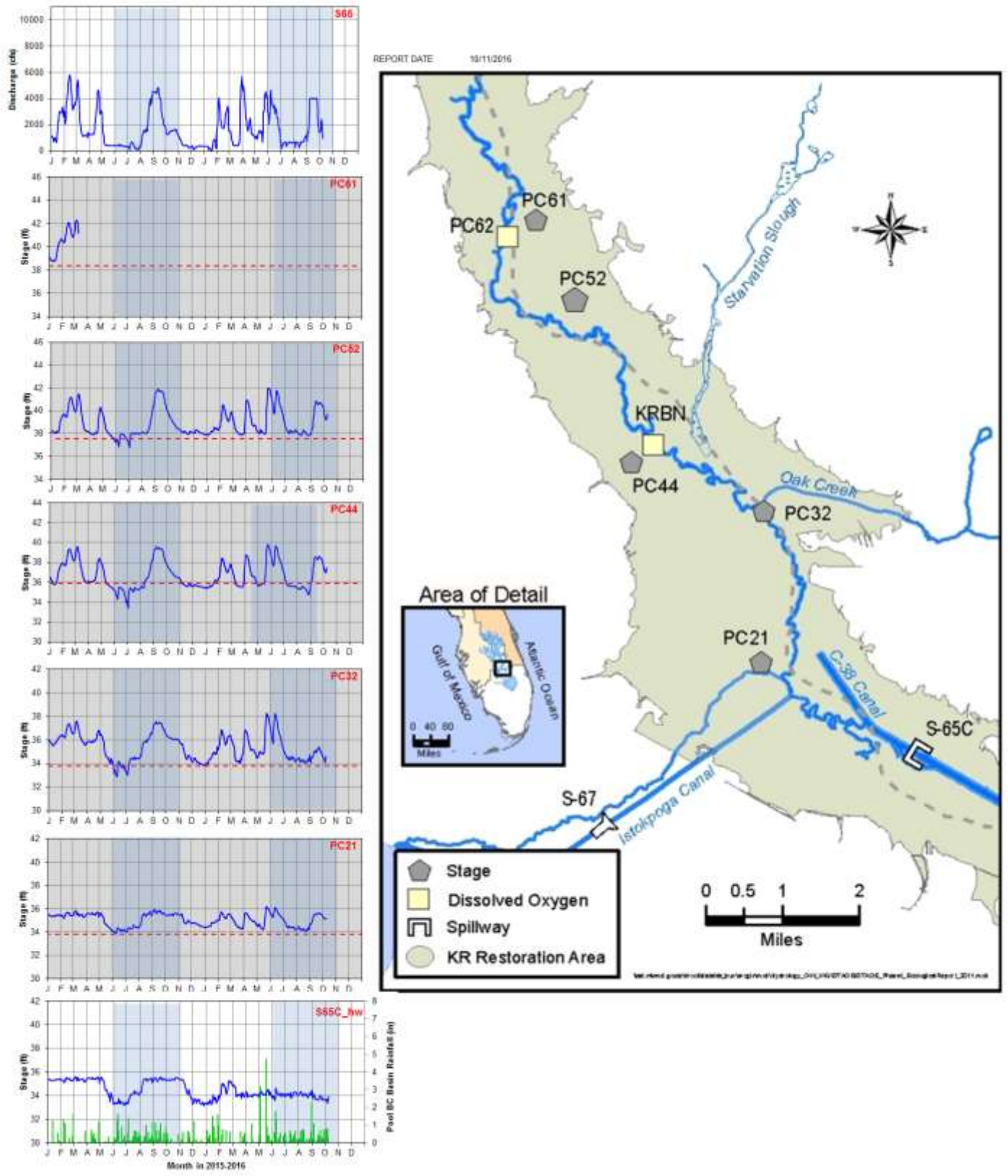


Figure 13. Discharge at S65, stages at five monitoring stations in the Phase I area of the Kissimmee River floodplain, and headwater stage at S65-C since January 1, 2015. The most recent data (~2 weeks) are provisional real-time data from SFWMD DualTrend; previous data are from SFWMD DB-HYDRO (validated). Dashed lines are ground elevations.

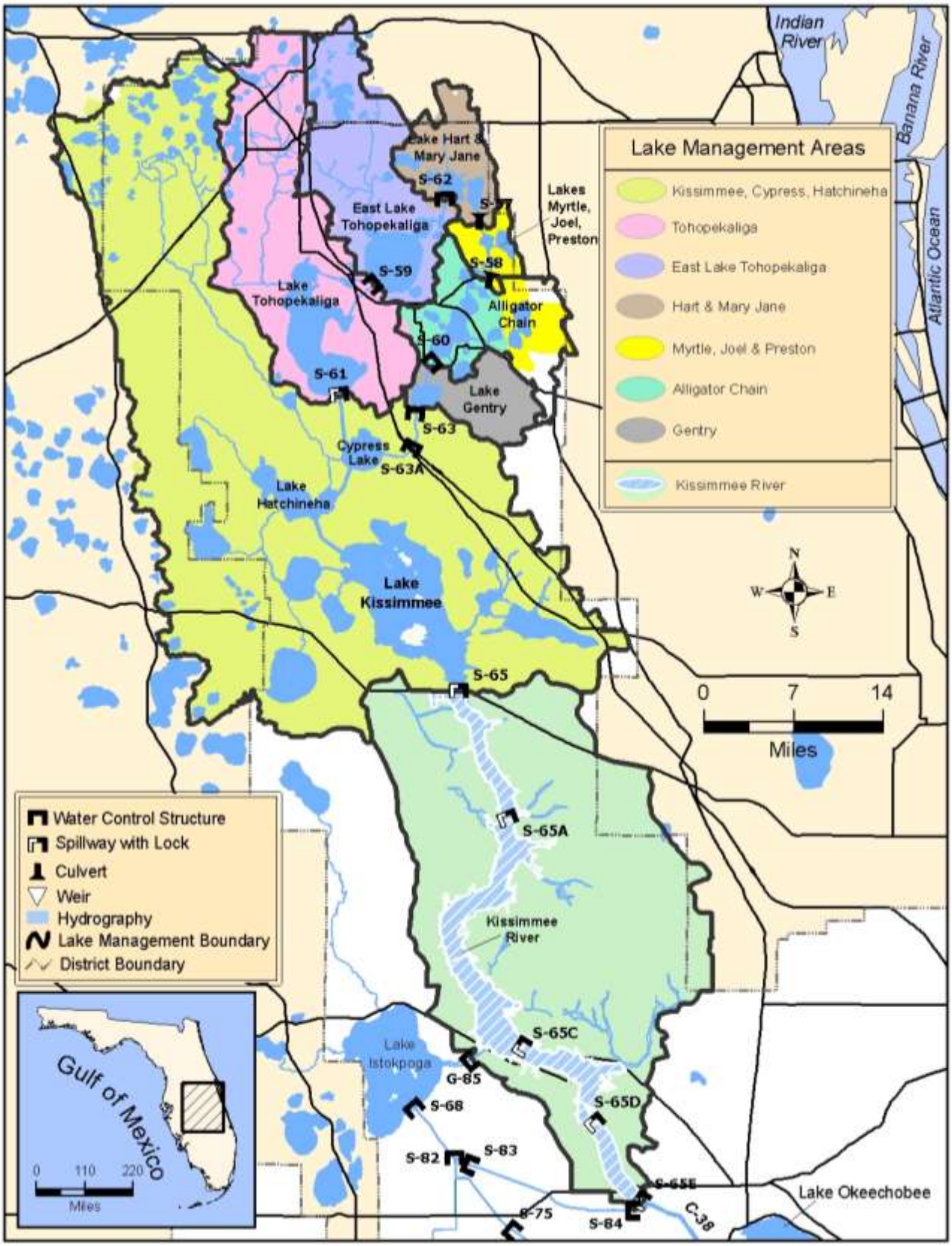


Figure 14. The Kissimmee Basin

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 16.01 feet NGVD for the period ending at midnight on October 10, 2016. This value is based on the use of four interior Lake stations (L001, L005, L006, and LZ40) and four perimeter stations (S352, S4, S308 and S133). Lake stage increased by 0.23 feet over the past week and is 0.82 feet higher than it was a month ago and 1.21 feet higher than it was a year ago (Figure 1). Lake stage rose to 16.16 feet over the past week, moving into the Intermediate sub-band, but it has decreased to 16.01 feet over the past two days and is currently in the Low sub-band (Figure 2). According to RAINDAR, 1.14 inches of rain fell directly over the Lake during the past seven days. The watershed to the south experienced similar rainfall amounts while most of the northern and eastern regions had higher rainfall (Figure 3). Less rain fell in the Caloosahatchee sub-basin to the west of the Lake.

Based on USACE reported values, current Lake inflow is approximately 7,068 cfs as detailed below.

Structure	Flow cfs
S65E	4129
S154	196
S84 & 84X	387
S71	298
S72	193
C5 (Nicodemus slough dispersed storage)	0
S191	627
S133 PUMPS	83
S127 PUMPS	55
S129 PUMPS	25
S131 PUMPS	11
S135 PUMPS	115
Fisheating Creek	948
S2 Pumps	0
S3 Pumps	0
S4 Pumps	0

Current Lake outflow is approximately 8,524 cfs with 6,317 cfs exiting at S77, 2,205 cfs exiting at S308 and 2 cfs exiting the L8 canal through Culvert 10A. No water exited through S351, S352 or S354. Corrected evapotranspiration value based on the L006 weather platform solar radiation data for this past week was 2,315 cfs.

Change in elevation equivalents and average weekly flows for major structures are presented in Figure 4. Weekly average values for S77 and S308 are based on USGS data for the below structure gauges.

Hurricane Matthew caused a phenomenon known as a seiche on the Lake. Seiches are typically caused when strong winds and rapid changes in atmospheric pressure push water from one end of a body of water to the other. The maximum wind gust recorded at the four major monitoring structures on the Lake (L001, L005, L006 and LZ40) during the peak of the hurricane was 40.8 mph at LZ40 at 9:30 pm on Oct. 6. A rapid change in water levels was recorded at that time with the most dramatic differences occurring at S352 in the southeast and at S133 in the north (Figure 5). As Hurricane Matthew passed to the northeast of the Lake, (Oct. 6 to Oct 7) strong north-northwest winds prevailed causing the stage at S352 to rise to almost 17.5 feet (NGVD). Concurrently, Lake stage at the northern

most site (S133) decreased to almost 14.5 feet (NGVD). A seiche of almost 1.5 feet along the northwest to southeast axis was the result. This seiche was less than that encountered during Hurricane Jeanne (over 11 feet) in 2004 but impacts to water quality, submerged aquatic vegetation (SAV) and emergent aquatic vegetation (EAV) communities have not yet been determined. Post-storm water quality samples were collected and are being processed at this time. Impacts to the EAV and SAV communities will be evaluated during the next two weeks.

No new MODIS imagery are available due to extreme cloud cover.

Water Management Recommendations

Although Lake stage decreased over the past two days, levels are still higher than last week and 0.51 feet above the top of the preferred stage envelope (15.5 feet NGVD). Stage is in the Low sub-band and decreasing but is still 0.01 feet from the bottom of the Intermediate sub-band.

Future short-term recommendations are to lower Lake levels. From an ecological perspective, the Lake is too high for this time of year and levels have been too high since the February rain event resulting in a loss of SAV and increased cyanobacterial blooms and associated toxins. If elevated Lake levels persist into the next growing season we expect additional damage to SAV and a resurgence of the bloom conditions that have characterized this past wet season.

The goal should be to continue the downward trend in Lake stage as levels have moved past the top of the preferred stage envelope. If high inflows persist, the potential exists for Lake levels to continue to rise into a range where additional ecological damage may occur. Near optimal Lake stages will be necessary this coming spring and summer to provide conditions conducive to the reestablishment of the SAV acreage lost this year due to high Lake stages.

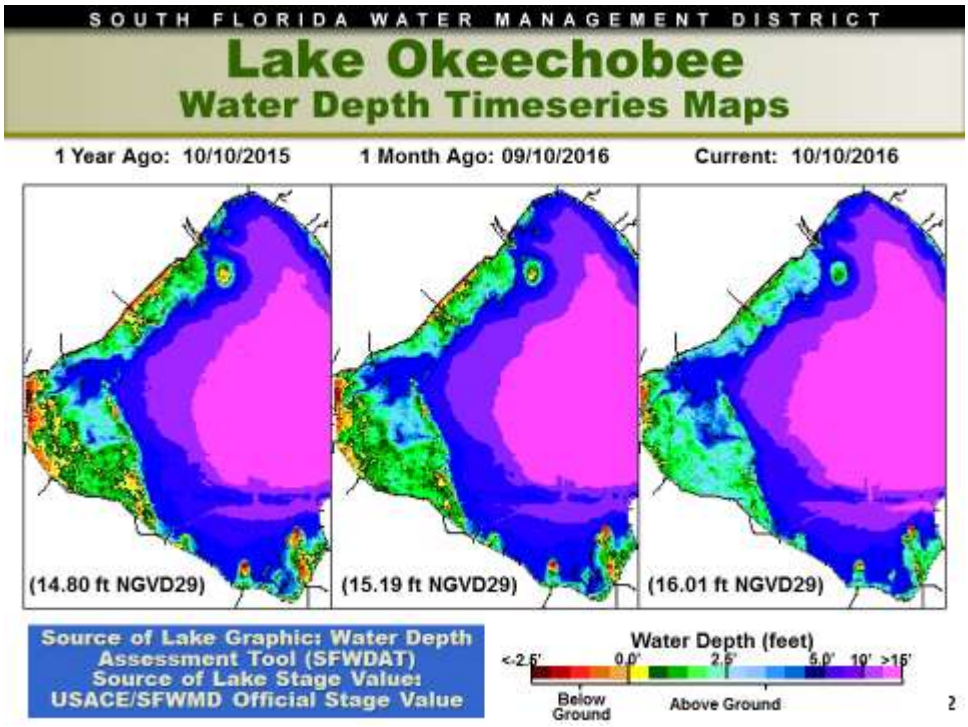


Figure 1

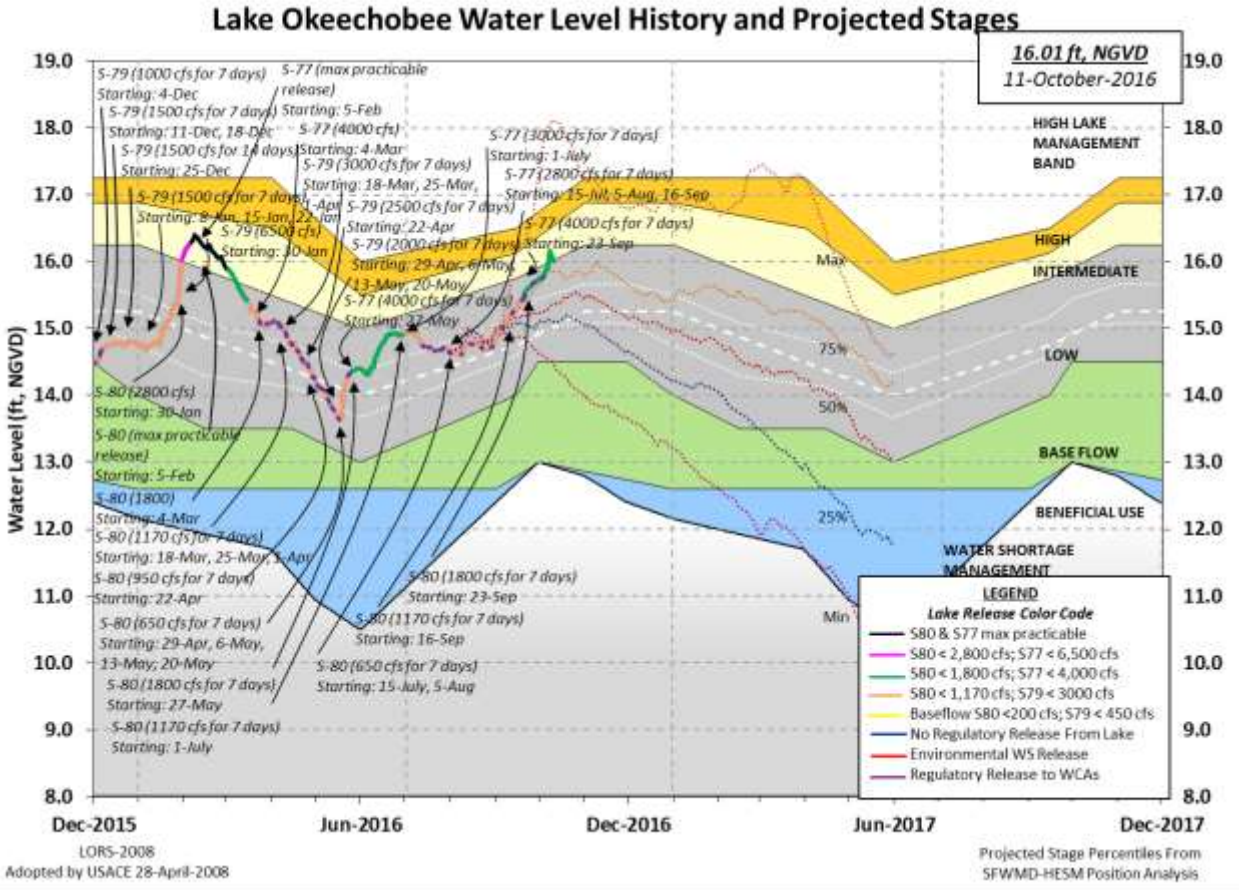

Lake Okeechobee Water Level History and Projected Stages
16.01 ft, NGVD
11-October-2016
HIGH LAKE MANAGEMENT BAND
HIGH
INTERMEDIATE
LOW
BASE FLOW
BENEFICIAL USE
WATER SHORTAGE MANAGEMENT
Max
75%
50%
25%
Min
Water Level (ft, NGVD)
19.0
18.0
17.0
16.0
15.0
14.0
13.0
12.0
11.0
10.0
9.0
8.0
Dec-2015
Jun-2016
Dec-2016
Jun-2017
Dec-2017
S-79 (1000 cfs for 7 days) Starting: 4-Dec
S-79 (1500 cfs for 7 days) Starting: 11-Dec, 18-Dec
S-79 (1500 cfs for 14 days) Starting: 25-Dec
S-79 (1500 cfs for 7 days) Starting: 8-Jan, 15-Jan, 22-Jan
S-79 (6500 cfs) Starting: 30-Jan
S-80 (2800 cfs) Starting: 30-Jan
S-80 (max practicable release) Starting: 5-Feb
S-80 (1800) Starting: 4-Mar
S-80 (1170 cfs for 7 days) Starting: 18-Mar, 25-Mar, 1-Apr
S-80 (950 cfs for 7 days) Starting: 22-Apr
S-80 (650 cfs for 7 days) Starting: 29-Apr, 6-May, 13-May, 20-May
S-80 (1800 cfs for 7 days) Starting: 27-May
S-80 (1170 cfs for 7 days) Starting: 1-July
S-77 (max practicable release) Starting: 5-Feb
S-77 (4000 cfs) Starting: 4-Mar
S-79 (3000 cfs for 7 days) Starting: 18-Mar, 25-Mar, 1-Apr
S-79 (2500 cfs for 7 days) Starting: 22-Apr
S-79 (2000 cfs for 7 days) Starting: 29-Apr, 6-May, 13-May, 20-May
S-77 (4000 cfs for 7 days) Starting: 27-May
S-80 (1800 cfs for 7 days) Starting: 23-Sep
S-80 (1170 cfs for 7 days) Starting: 16-Sep
S-80 (650 cfs for 7 days) Starting: 15-July, 5-Aug
S-77 (3000 cfs for 7 days) Starting: 1-July
S-77 (2800 cfs for 7 days) Starting: 15-Jul, 5-Aug, 16-Sep
S-77 (4000 cfs for 7 days) Starting: 23-Sep
LEGEND
Lake Release Color Code
S80 & S77 max practicable
S80 < 2,800 cfs; S77 < 6,500 cfs
S80 < 1,800 cfs; S77 < 4,000 cfs
S80 < 1,170 cfs; S79 < 3000 cfs
Baseflow S80 <200 cfs; S79 < 450 cfs
No Regulatory Release From Lake
Environmental WS Release
Regulatory Release to WCAs
LORS-2008
Adopted by USACE 28-April-2008
Projected Stage Percentiles From SFWMD-HESM Position Analysis

Figure 2

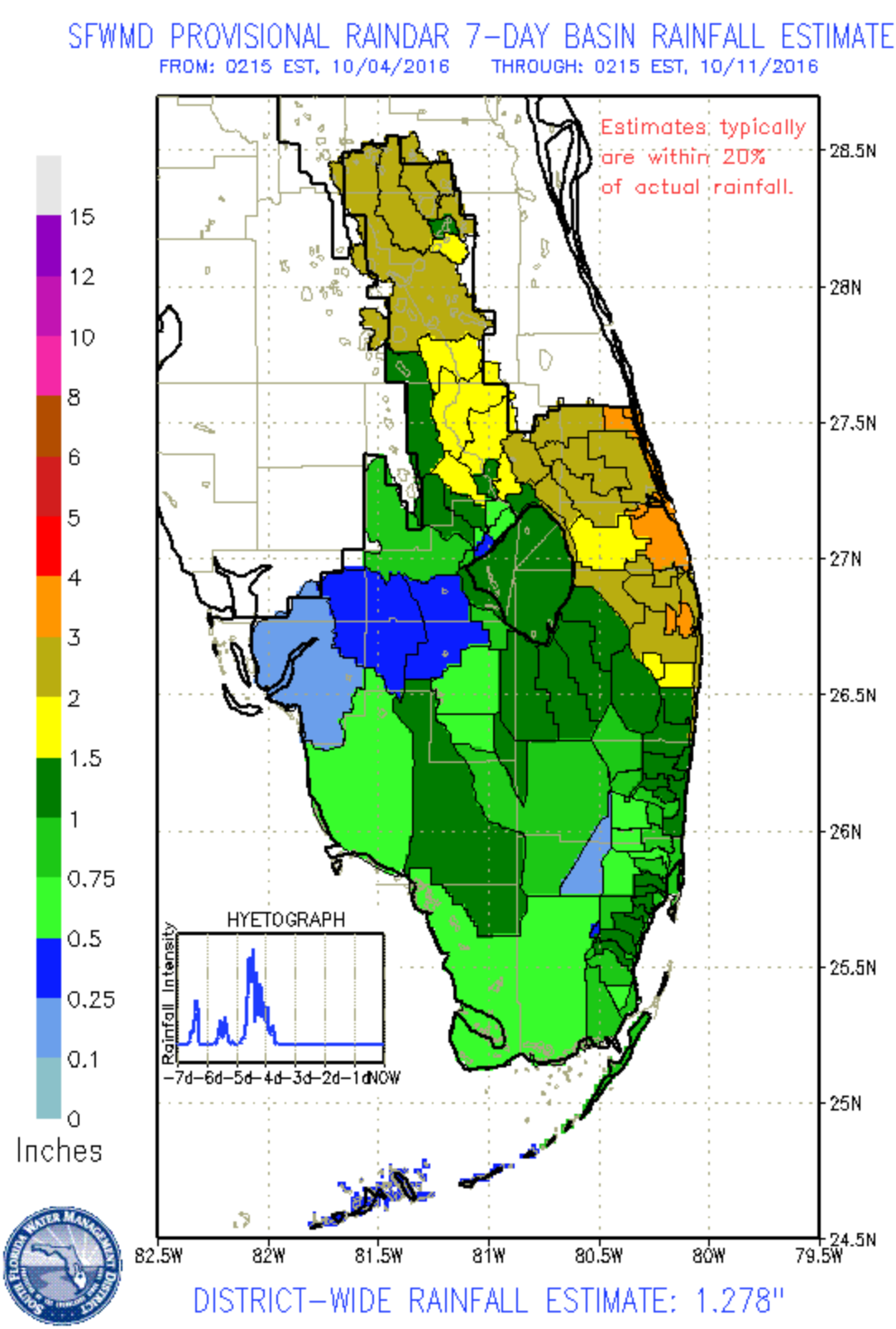

SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES
FROM: 0215 EST, 10/04/2016 THROUGH: 0215 EST, 10/11/2016
Estimates typically are within 20% of actual rainfall.
15
12
10
8
6
5
4
3
2
1.5
1
0.75
0.5
0.25
0.1
0
Inches
HYETOGRAPH
Rainfall Intensity
-7d-6d-5d-4d-3d-2d-1dNOW
28.5N
28N
27.5N
27N
26.5N
26N
25.5N
25N
24.5N
82.5W
82W
81.5W
81W
80.5W
80W
79.5W
DISTRICT-WIDE RAINFALL ESTIMATE: 1.278"

Figure 3

INFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S65E	3814	0.121
S71 & 72	1017	0.032
S84 & 84X	2196	0.070
Fisheating Creek	1044	0.033
Rainfall	N.A.	0.095
OUTFLOWS	**Average Daily Flow Past Week cfs**	**Feet of Change Past Week**
S77	4386	0.139
S308	N.A.	N.A.
S351	0	0.000
S352	0	0.000
S354	0	0.000
L8	7	0.000
ET	2315	0.073

Figure 4

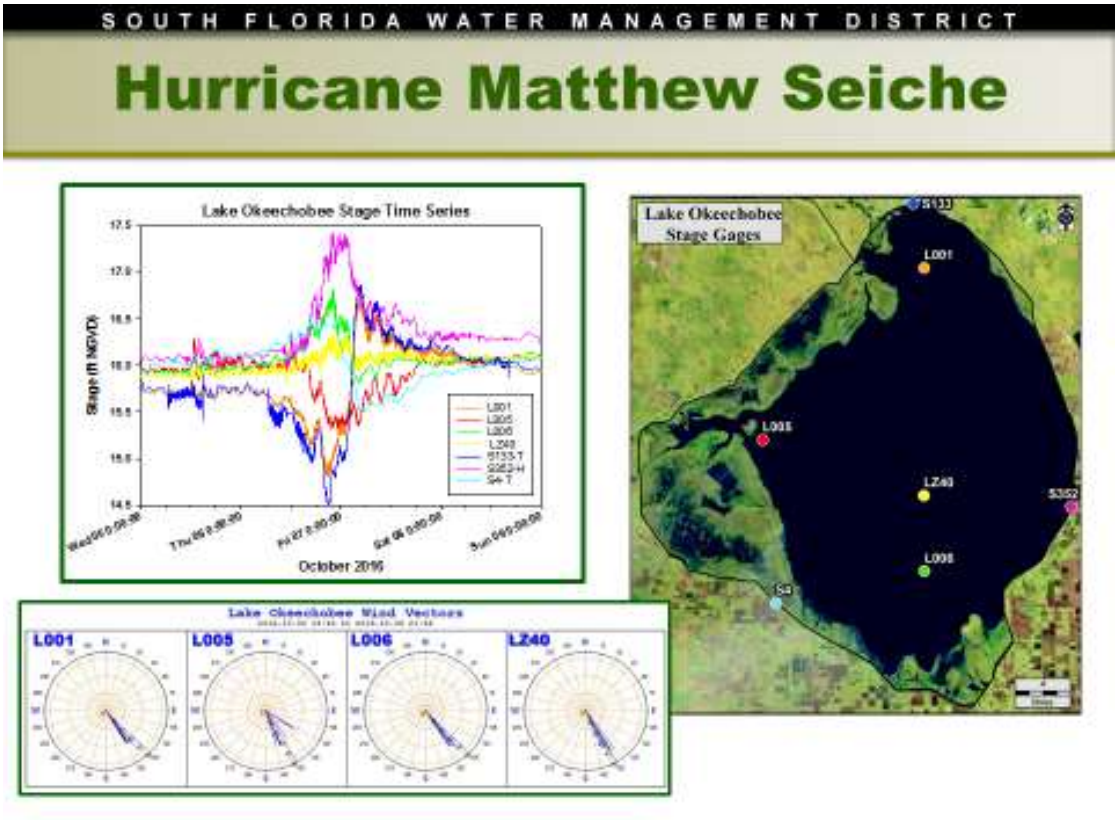


Figure 5

Lake Istokpoga

The Lake Istokpoga regulation schedule began its ascension towards winter pool stage of 39.50 feet NGVD on August 2, 2016. Lake stage is 39.10 feet NGVD and is currently 0.27 feet below its regulation stage of 39.37 feet NGVD (Figure 6). Average flows into the Lake from Arbuckle and Josephine creeks were 888 cfs and 342 cfs respectively, which is a decrease in total flow from the previous week. Average discharge from S68 and S68X this past week was 2,426 cfs, an increase from the preceding week. According to RAINDAR, 1.18 inches of rain fell in the Lake Istokpoga watershed during the past seven days.

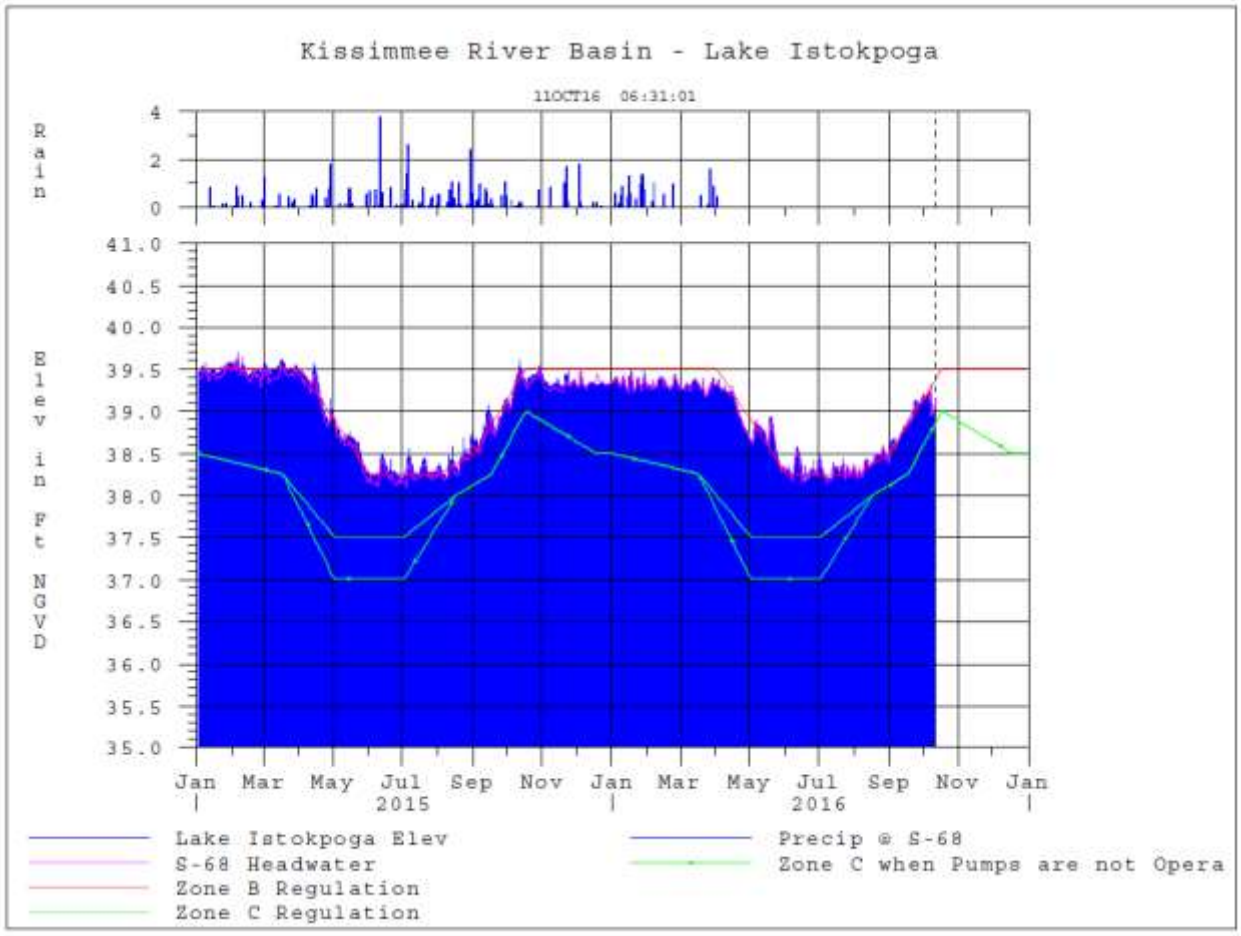


Figure 6

ESTUARIES

St. Lucie Estuary

Over the past week, provisional flows averaged about 2,129 cfs at S-80, 1,187 cfs downstream of S-308, 826 cfs at S-49 on C-24, 949 cfs at S-97 on C-23, and 692 cfs from Ten Mile Creek at the Gordy Road Structure. Average inflow from tidal basin tributaries is estimated to be 1,461 cfs (Figures 1 and 2). Total inflow averaged about 6,057 cfs last week and 3,584 cfs over last month.

Over the past week, salinity decreased throughout the estuary (Table 1, Figures 3 and 4). The seven-day moving average salinity of the water column at the US1 Bridge is about 1.1. Salinity conditions in the middle estuary are in the poor range for the adult eastern oyster.

Table 1. Seven-day average salinity at three monitoring stations in the St. Lucie Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for adult eastern oysters (*Crassostrea virginica*) in the middle estuary.

Sampling Site	Surface	Bottom	Envelope
HR1 (N. Fork)	**0.5** (1.4)	**0.6** (2.3)	NA[1]
US1 Bridge	**1.0** (2.5)	**1.2** (3.8)	10.0-26.0
A1A Bridge	**6.9** (8.4)	**15.2** (18.3)	NA

[1]Envelope not applicable

Caloosahatchee Estuary

During the past week, provisional flows averaged approximately 4,386 cfs downstream of S-77, 5,676 cfs at S-78, and 7,326 cfs at S-79. Average inflow from tidal basin tributaries is estimated to be 1,181 cfs (Figures 5 and 6). Total inflow averaged 8,507 cfs last week and 7,203 cfs over last month.

Over the past week in the estuary, surface salinity remained about fresh to Shell Point and slightly increased at the Sanibel Causeway (Table 2, Figures 7 and 8). The seven-day average salinity values are within the good range for adult oysters at Sanibel, in the fair range at Shell Point and in the poor range at Cape Coral (Figure 9). The 30-day moving average surface salinity is 0.2 at Val I-75 and 0.2 at Ft. Myers. Salinity conditions at Val I-75 are in the good range for tape grass.

Table 2. Seven-day average salinity at six monitoring stations in the Caloosahatchee Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for tape grass (*Vallisneria americana)* at Val I-75 and for adult eastern oysters (*Crassostrea virginica*) elsewhere.

Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	**0.2** (0.2)	**0.2** (0.2)	NA[1]
*Val I75	**0.2**[*](0.2[*])	**0.2**[*](0.2[*])	0.0-5.0[2]
Ft. Myers Yacht Basin	**0.2** (0.2)	**0.2** (0.2)	NA
Cape Coral	**0.2** (0.4)	**0.2** (0.6)	10.0-30.0
Shell Point	**5.1** (7.5)	**11.9** (11.2)	10.0-30.0
Sanibel	**22.3** (20.3)	**25.9** (23.3)	10.0-30.0

[1]Envelope not applicable and [2]Envelope is based on a 30-day average.
*Val I75 is temporarily offline due to site construction,
Salinity values are estimated using models developed for this site.

Monitoring data collected by the River, Estuary and Coastal Observing Network of Sanibel-Captiva Conservation Foundation using continuous sensors are summarized in Table 3 as concentration ranges of Chlorophyll *a* and dissolved oxygen at Beautiful Island, Ft. Myers, and Shell Point in the Caloosahatchee Estuary.

Table 3. Weekly ranges of Chlorophyll *a* (a measure of algal biomass) and dissolved oxygen concentrations at three monitoring stations maintained by the Sanibel-Captiva Conservation Foundation.

	RECON Monitoring Stations		
	Beautiful Island	**Ft. Myers**	**Shell Point**
Chlorophyll *a* (µg/l)	5.2 – 10.5	5.3 – 6.3	1.6 – 6.0
Dissolved Oxygen (mg/l)	3.6 – 5.4	5.0 – 7.3	3.9 – 7.1

The Florida Fish and Wildlife Research Institute reported on October 10, 2016, that *Karenia brevis*, the Florida red tide organism, was observed in background to medium concentrations in nineteen samples collected from Lee County. In the Caloosahatchee area, one sample near Captiva Pass had a medium concentration. All other samples in the area had very low or undetectable concentrations.

Water Management Recommendations

Given the current estuarine conditions, there are no ecological benefits associated with additional releases from Lake Okeechobee.

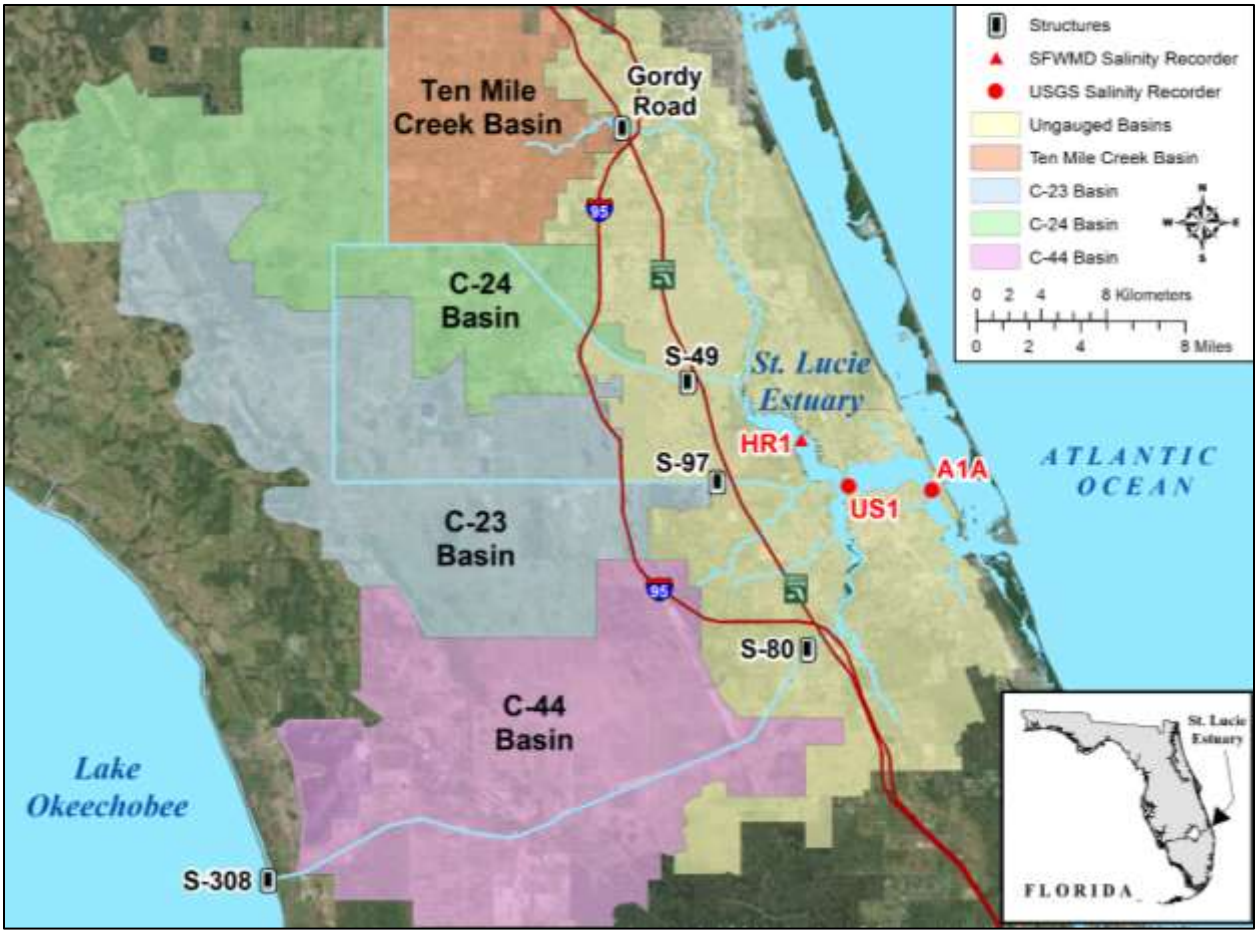


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

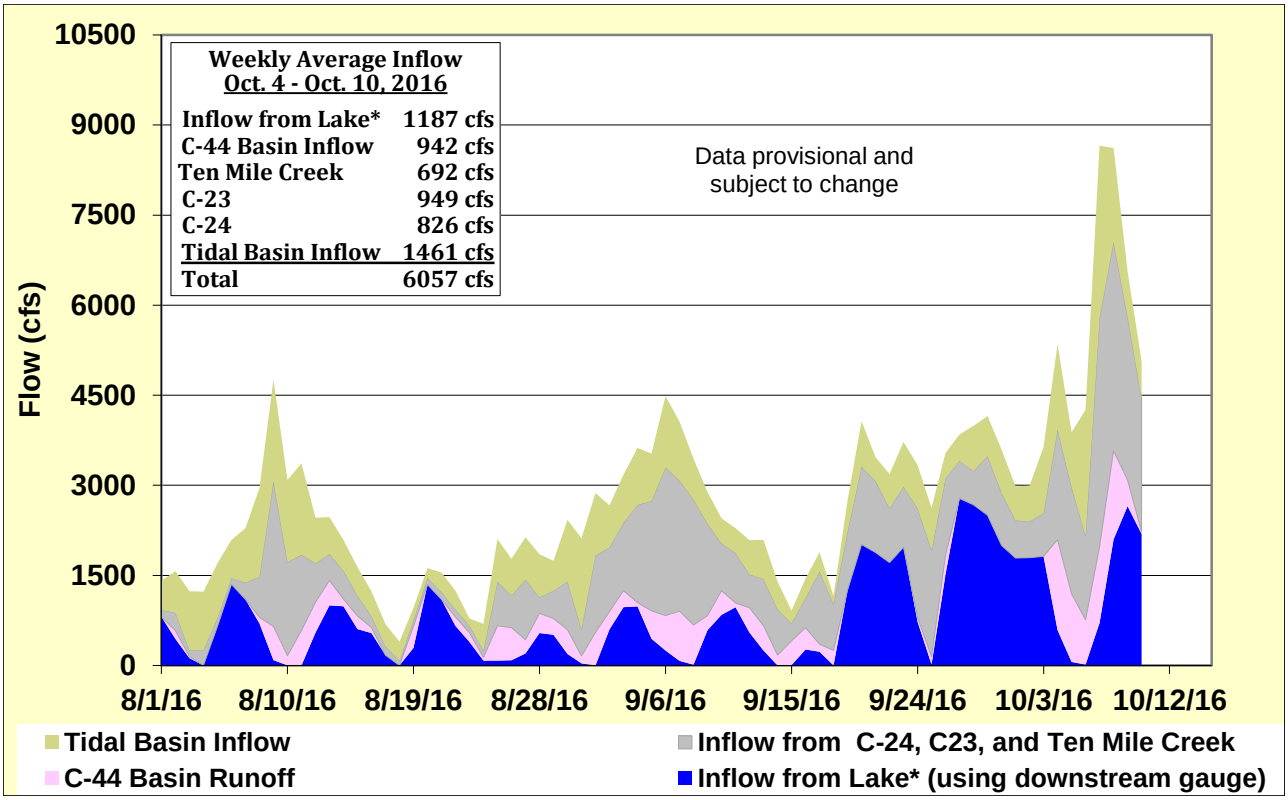


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

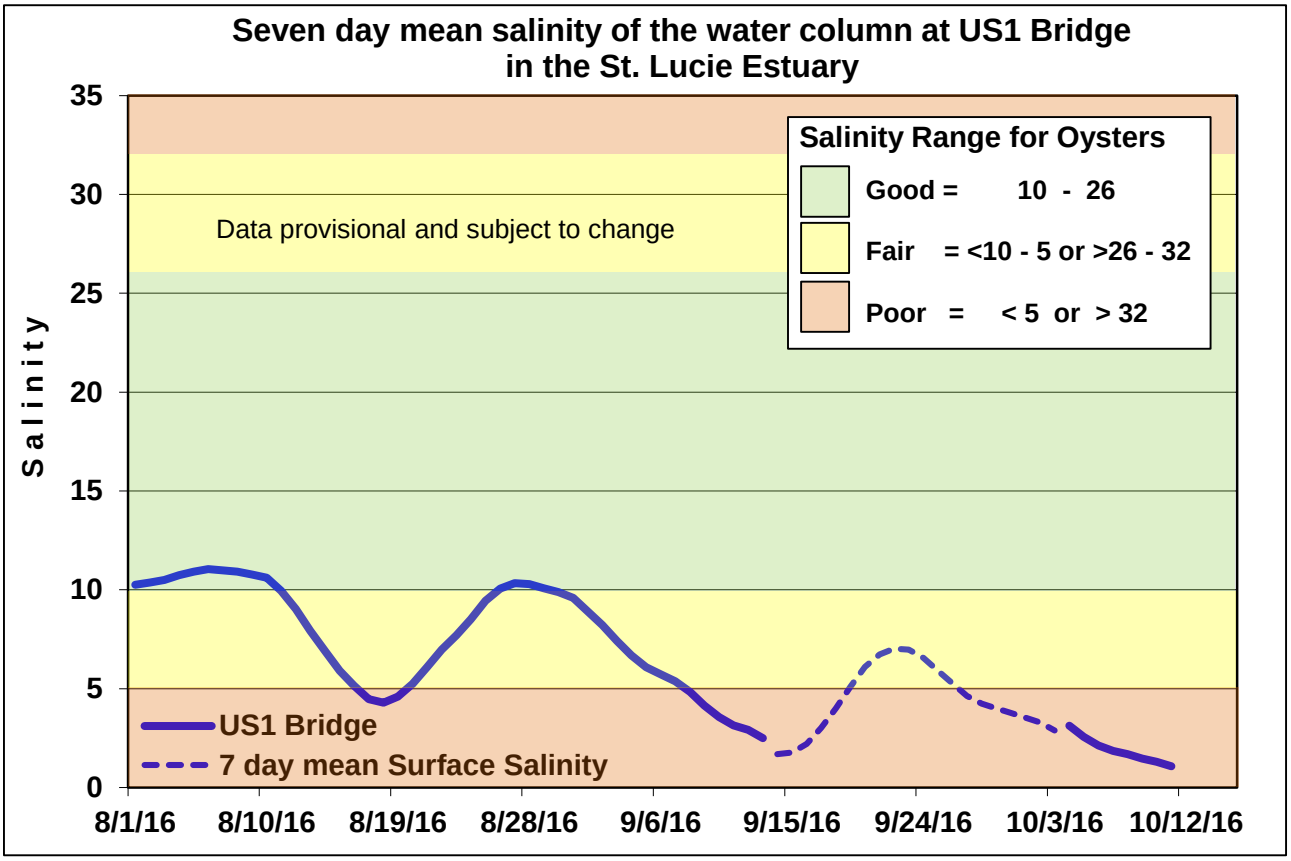


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

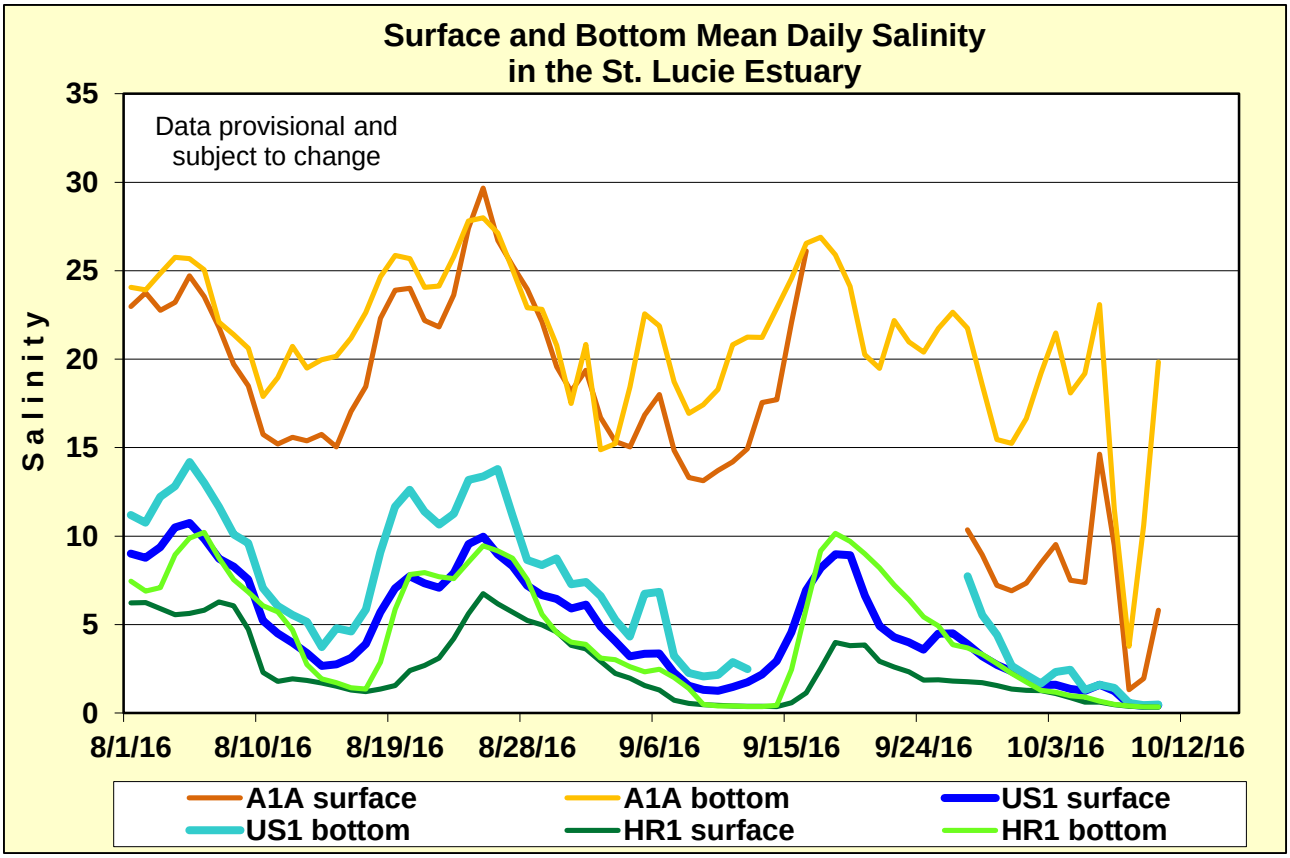


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

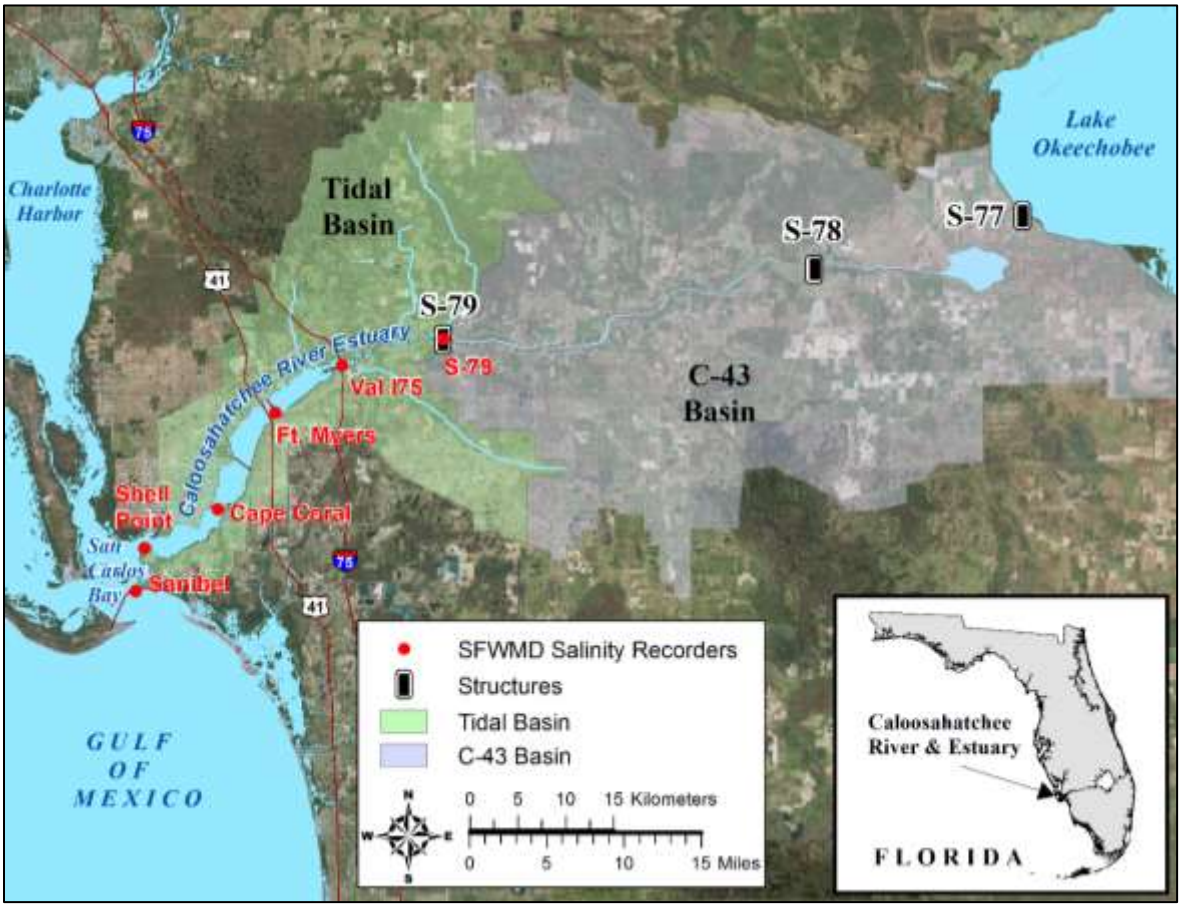


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

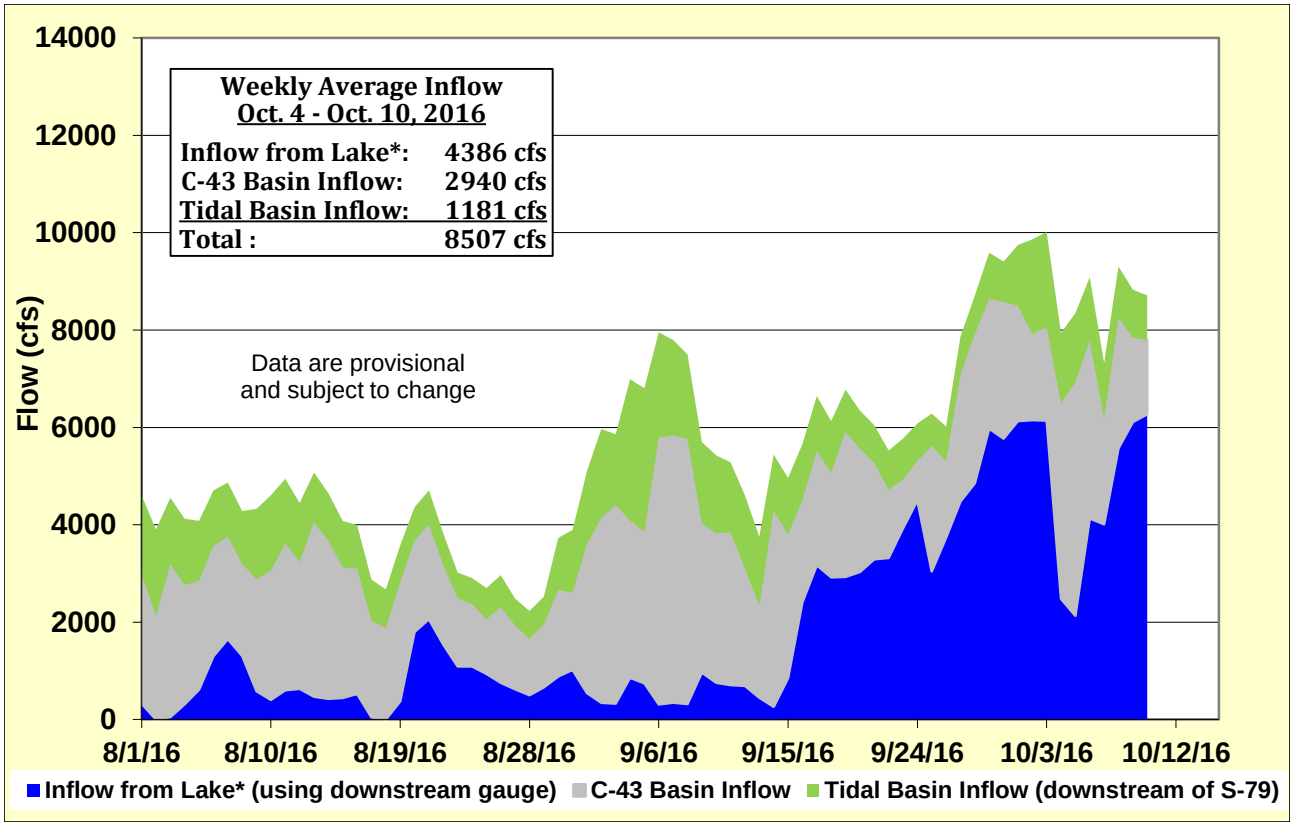
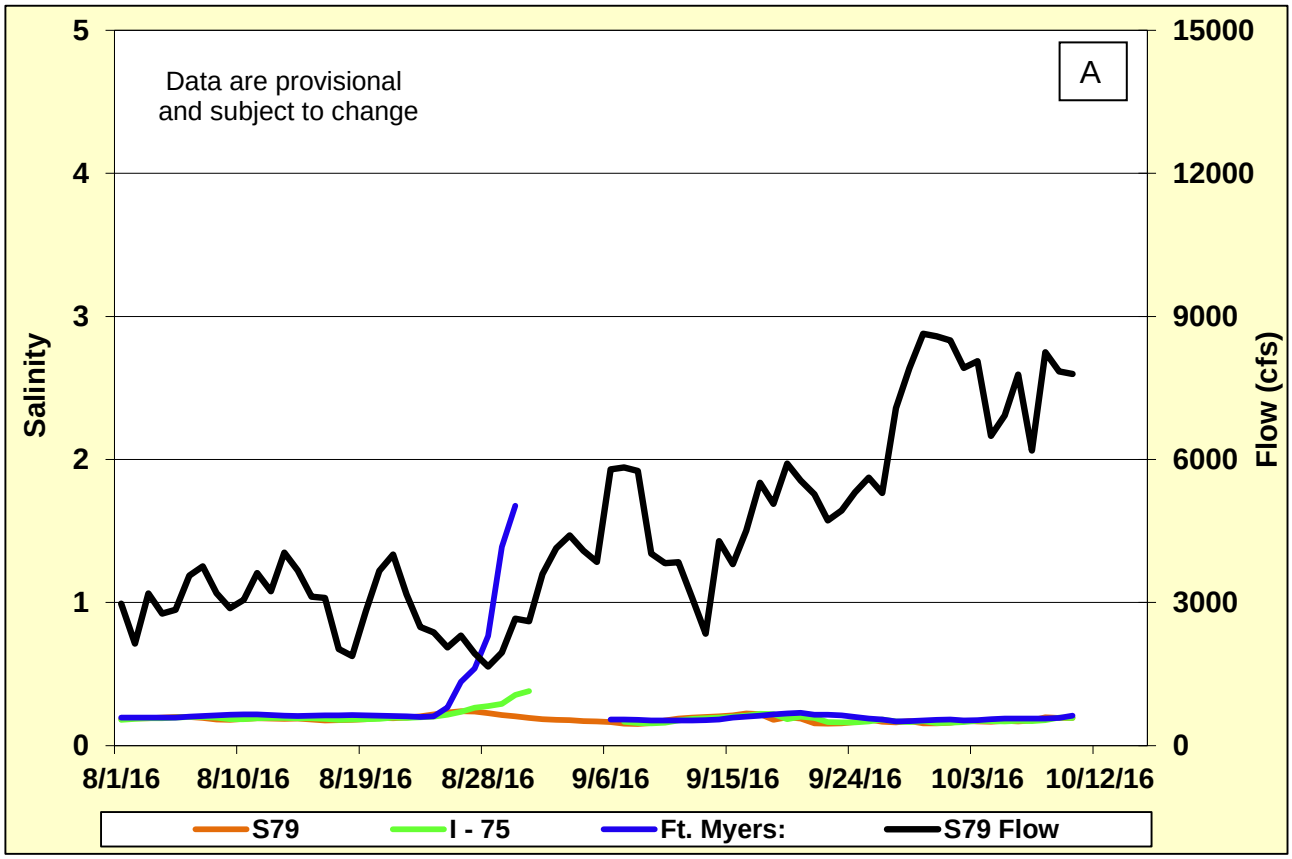


Figure 6. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.



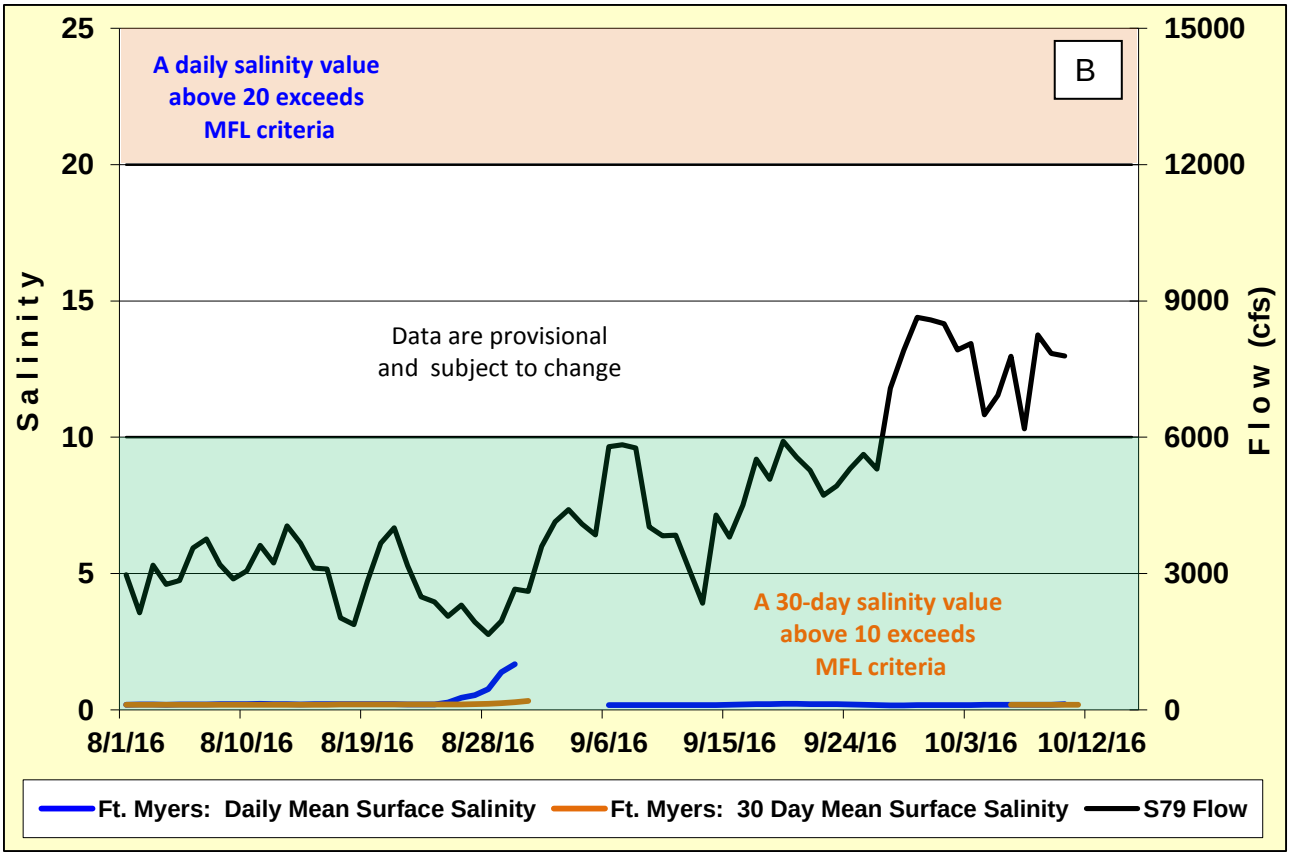


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations (A) and 30-day moving average salinity at Ft. Myers (B).

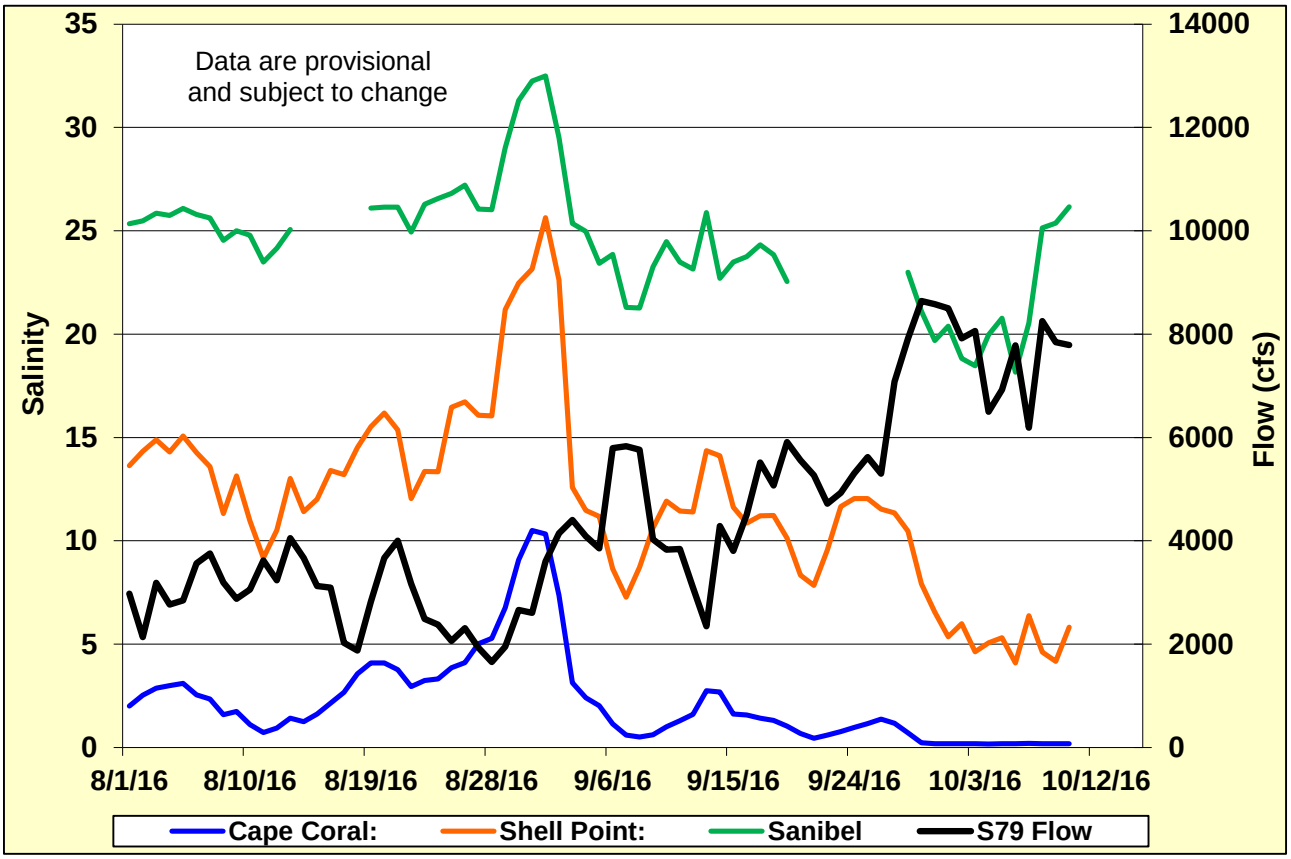


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

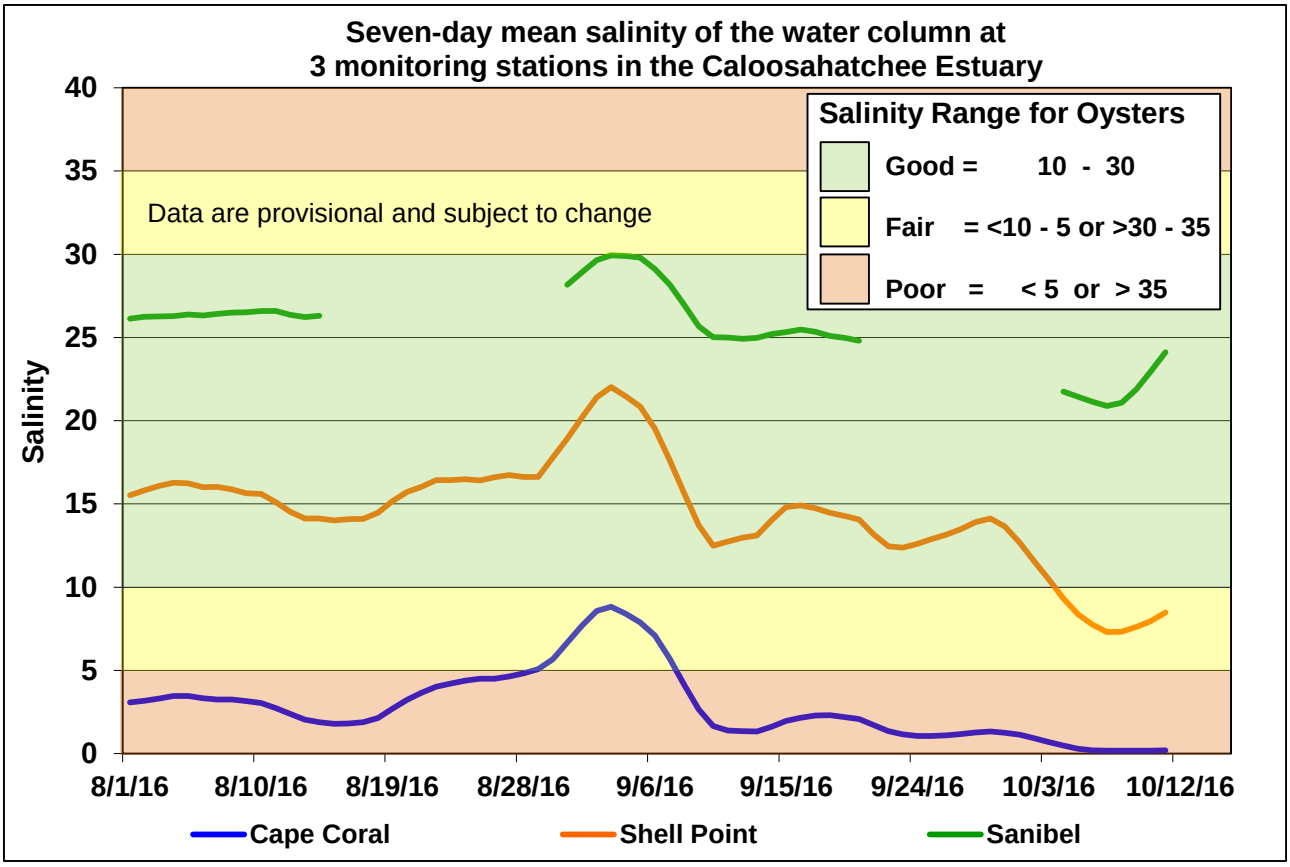
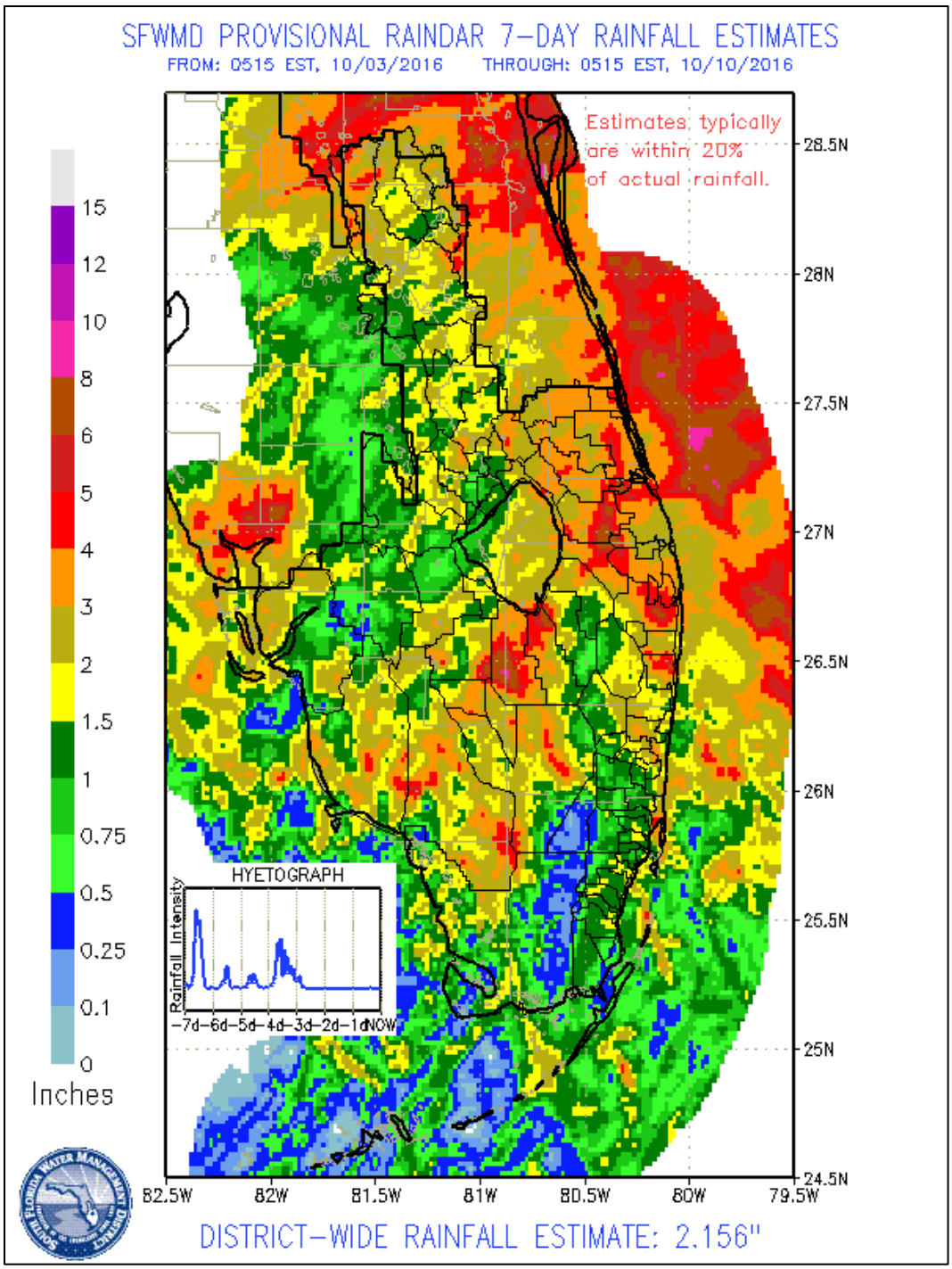


Figure 9. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

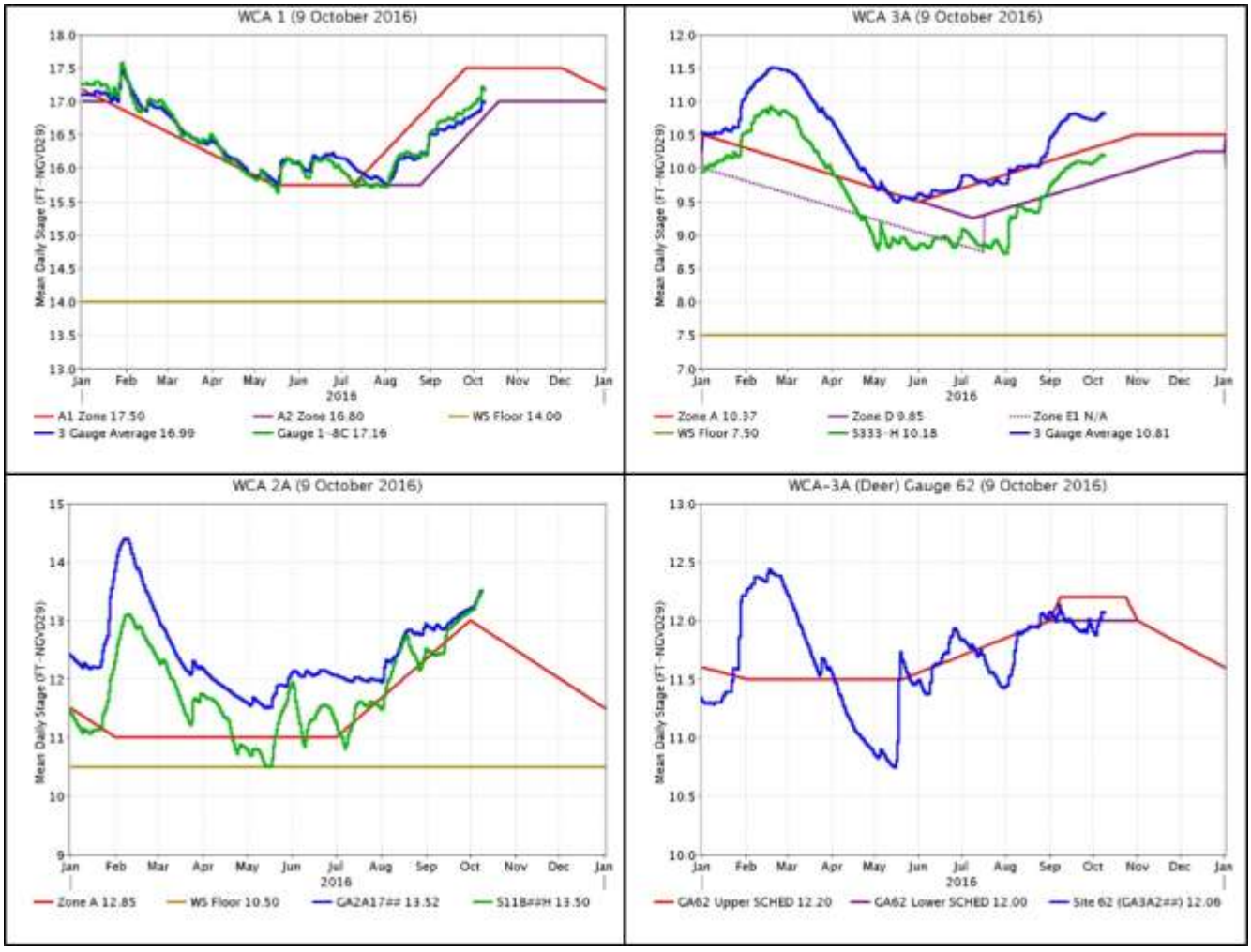
GREATER EVERGLADES

The WCAs and Everglades National Park (ENP) did not get much rain impact from Hurricane Matthew with basin averages ranging from 0.49 to 2.12 inches. The highest maximum rainfall was six inches within WCA-3A which is lower than last week.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	1.61	0.17
WCA-2A	1.49	0.29
WCA-2B	1.31	-0.03
WCA-3A	2.12	0.10
WCA-3B	0.49	-0.03
ENP	1.00	-0.09

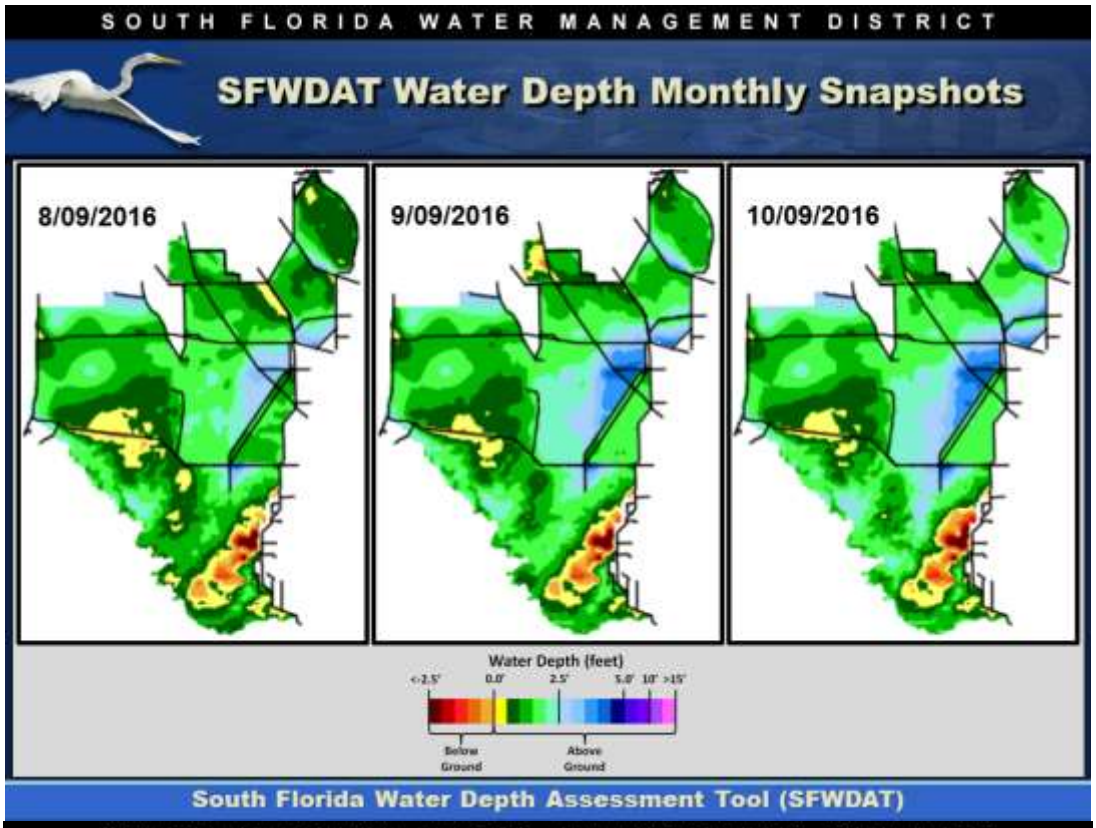


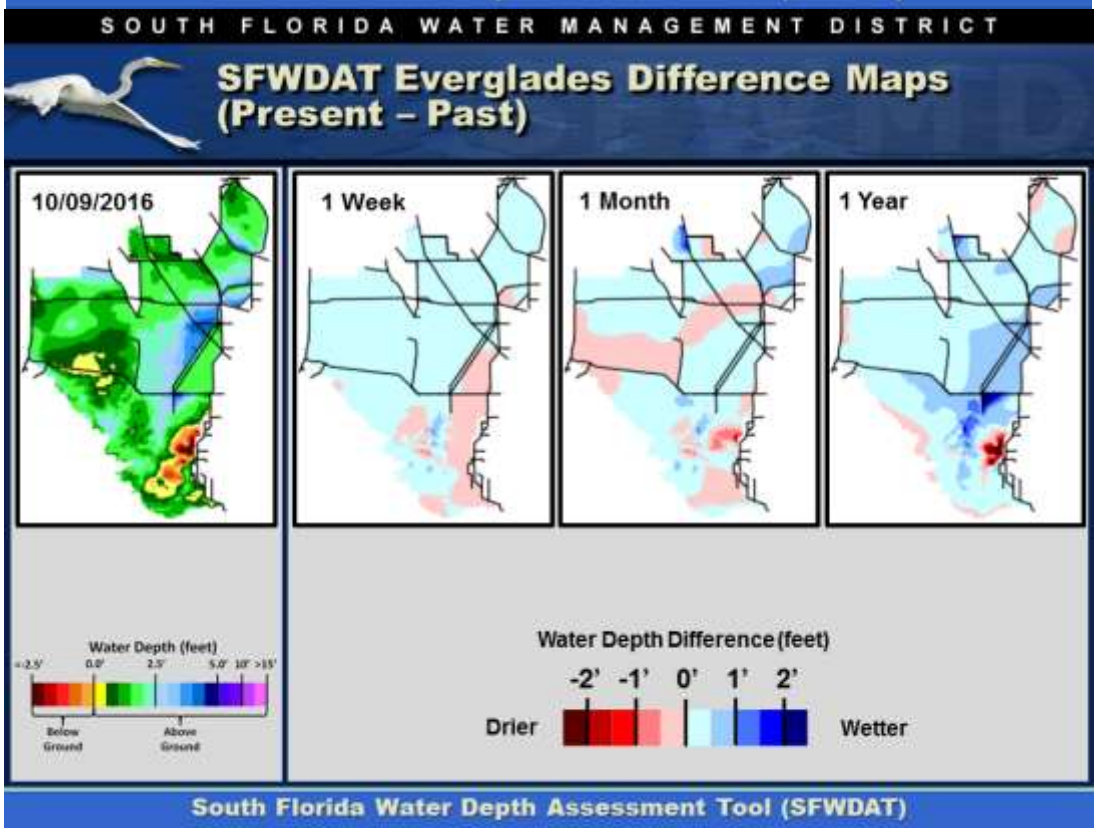
Regulation Schedules: Stages are still above regulation for two of the four areas. The WCA-1 three-gauge average is −0.51 feet below zone A1 and 0.19 feet above zone A2, and the northwestern WCA-3A gauge stage (gauge 62) is −0.14 feet below the upper schedule and 0.06 feet above the lower schedule. The other two areas remain above schedule: WCA-2A stage is 0.67 feet above regulation and the WCA-3A three-gauge average stage is 0.44 feet above regulation.



Water Depths and Changes: Water levels are mostly higher than those in September and August and are above ground in most areas. Two notable exceptions are southern Big Cypress and the area between Shark and Taylor Sloughs, which are slightly drier than a month ago. Water depths at monitored gauges other than in WCA-2B range from 1.53 feet to 2.90 feet.

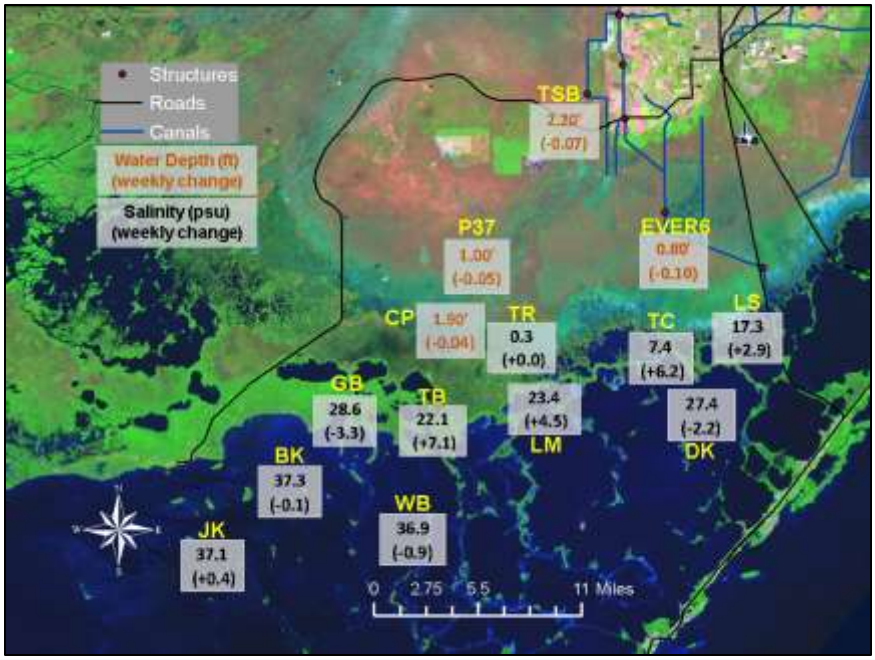
Stage changes were mixed again last week with most areas increasing, but WCA-3B and eastern ENP decreased. Individual gauge changes ranged from -0.09 feet (WCA-3A) to 0.29 feet (WCA-3B). Stages are mixed when compared to a month ago, but are mostly wetter than a year ago.

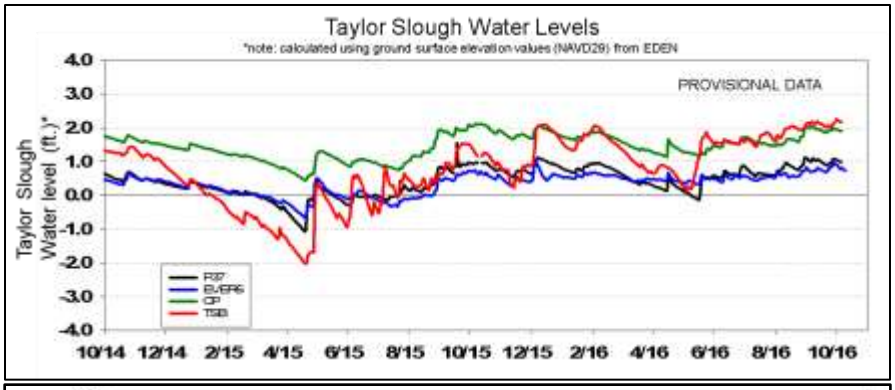




Taylor Slough and Florida Bay: Water levels were decreasing this past week in Taylor Slough and the C-111 panhandle area, but communication was lost with the platforms on Friday (October 7) and has not yet been restored. All areas are still average to six inches above average with northern Taylor Slough being the furthest from average.

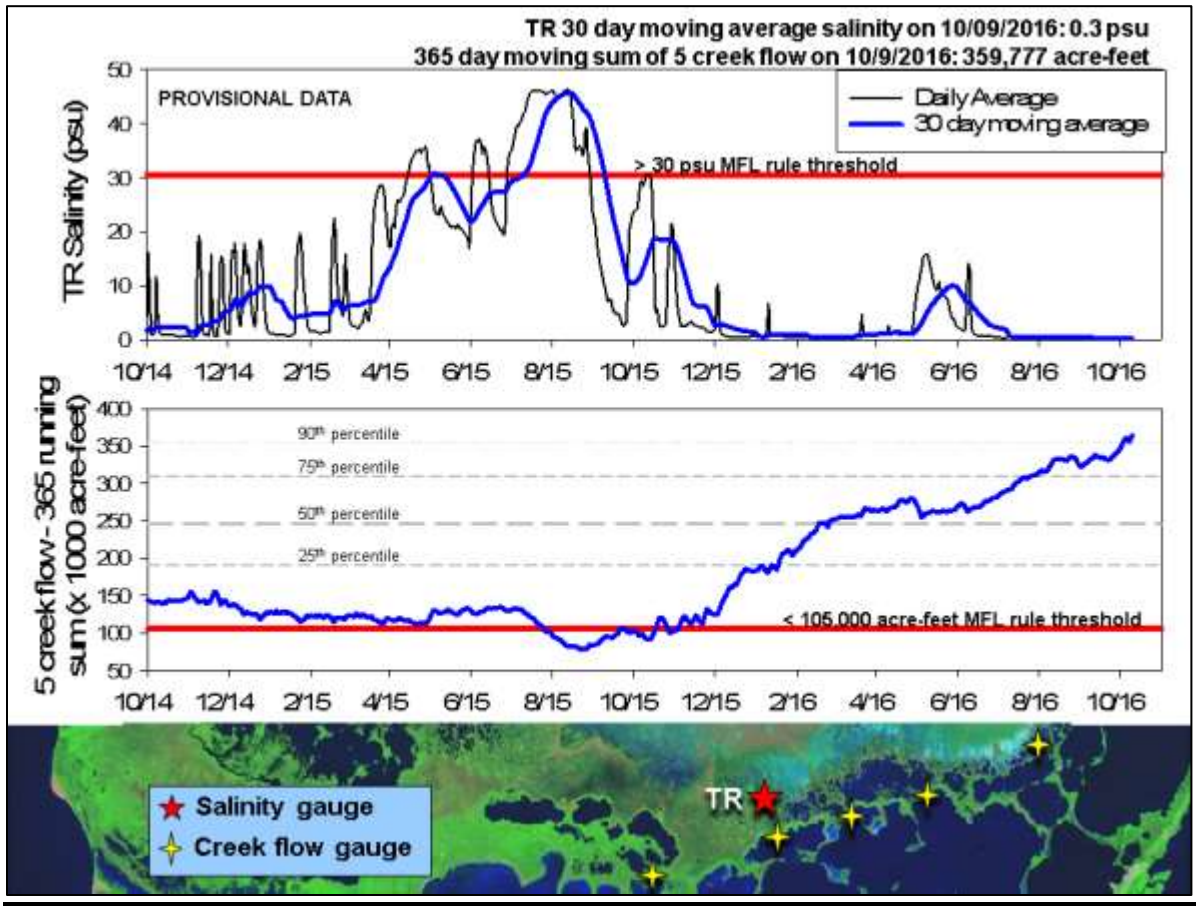
Nearshore salinities in Florida Bay increased on Friday, coincident with strong negative flows, and are mostly decreasing now. Daily average salinities now range from 7 to 37 psu with the highest salinity in western Florida Bay.





Florida Bay MFL: The MFL sentinel site TR in the mangrove zone remains near fresh at 0.3 psu, and the 30-day moving average salinity at TR is also at a seasonal 0.3 psu. The 365-day running sum of the cumulative flow from the five creeks feeding Florida Bay increased about 8,000 acre-feet this past

week to 359,777 acre-feet (above the average of 257,628 acre feet). All five creeks experienced strong negative flows on Friday (October 7). Creek flow is provisional data from the USGS and is highly variable.



Water Management Recommendations

- Water levels in WCA-3A and WCA-2A should be lowered. Closures initiated by FWC in the WCAs are still in effect due to high water levels and expectation of continued high water.

- The depth at gauge 65 (southern WCA-3A) has increased again this week to 2.90 feet and has been above 2.5 feet for a sixth consecutive week. We recommend that water depths in southern WCA-3A be reduced and remain below 2.5 feet throughout the wet season to protect tree island forests that were inundated for over 20 weeks in the dry season.

- Ascension rates need to remain under 0.25 feet per week to protect habitat and wildlife, including apple snails, prey of the endangered snail kite.

Recommendations appear in the summary table below. The red text represents new or modified information or recommendations.

Everglades Ecological Recommendations, Oct. 11th, 2016 (red is new)

Area	Current Condition	Cause(s)	Recommendation	Reasons
WCA-1	Stages rose 0.15' to 0.19'	Rainfall, ET, management	Limit ascension rates to a maximum of 0.25 ft/week.	Ascension rates of <0.25'/week will protect habitat and wildlife including reproducing apple snails.
WCA-2A	Stages rose 0.29'	Rainfall, ET, management	Maintain ascension rates <0.25 ft/week. FWC has initiated closures to protect wildlife due to high water levels.	Ascension rates of <0.25'/week will protect habitat and wildlife including reproducing apple snails, prey for endangered snail kites.
WCA-2B	Stages fell −0.03'	Rainfall, ET, management	Limit ascension rates to extent possible with a maximum of 0.25 ft/week.	Ascension rates of <0.25'/week will protect habitat and wildlife including reproducing apple snails.
WCA-3A NE	Stage rose 0.07'	Rainfall, ET, management	Reduce stages in northern WCA-3A. FWC has initiated closures to protect wildlife due to high water levels. Ascension rates should be limited to the extent possible of <0.25 ft/week.	Closures may eliminate deer hunting and possibly hunting of other species. They will also eliminate access to tree islands in WCAs -3A and -2A. Ascension rates not exceeding 0.25'/week will protect habitat and wildlife including reproducing apple snails.
WCA-3A NW	Stage rose 0.20'	Rainfall, ET, management		
Central WCA-3A S	Stage rose 0.06'	Rainfall, ET, management	Lower water depth at gauge 65. Slow the ascension rates to the extent possible with a maximum of 0.25 ft/week. When flows are changed a gradual reduction is recommended (stepping down over several days). FWC has initiated closures to protect wildlife due to high water levels.	Water depths at gauge 65 should remain below 2.5 feet over this upcoming wet season. Keeping depths below 2.5' at gauge 65 is important to allow tree island vegetation to recover from stress of the recent extended inundation duration. Ascension rates of <0.25'/week will protect habitat and wildlife including reproducing apple snails.
Southern WCA-3A S	Stage rose 0.08'	Rainfall, ET, management		
WCA-3B	Stages changed −0.06' to +0.03'	Rainfall, ET, management	Limit ascension rates to extent possible with a maximum of 0.25 ft/week.	Ascension rates of <0.25'/week will protect habitat and wildlife including reproducing apple snails.
ENP-SRS	Stage fell −0.09'	ET, rainfall, topography, management	Make discharges to the Park according to the ERTP rainfall plan.	Keep peat wet to promote native habitat and maintain wetland plant and animal communities.
ENP-CSSS habitats	S-12A and S-12B have been opened.	Rainfall, ET, management	Follow rainfall plan for releases. Gradual reduction in flows through S333, and the S-12 structures when they decrease is recommended (stepping down over several days). Follow guidance in C-111 western spreader canal project operations manual.	Sparrows have ceased breeding for 2016. Future operations need to continue to provide appropriate hydrological and habitat conditions for breeding in subpopulation A.
Taylor Slough	Average to 6 inches above average	Rain, ET, inflows	Move water southward as needed	Provide freshwater buffer for ecosystems and maintain low salinity conditions downstream
FB- Salinity	0 to 8 psu above average	Rain, ET, inflows, wind	Move water southward as needed	Maintain lower salinity levels.